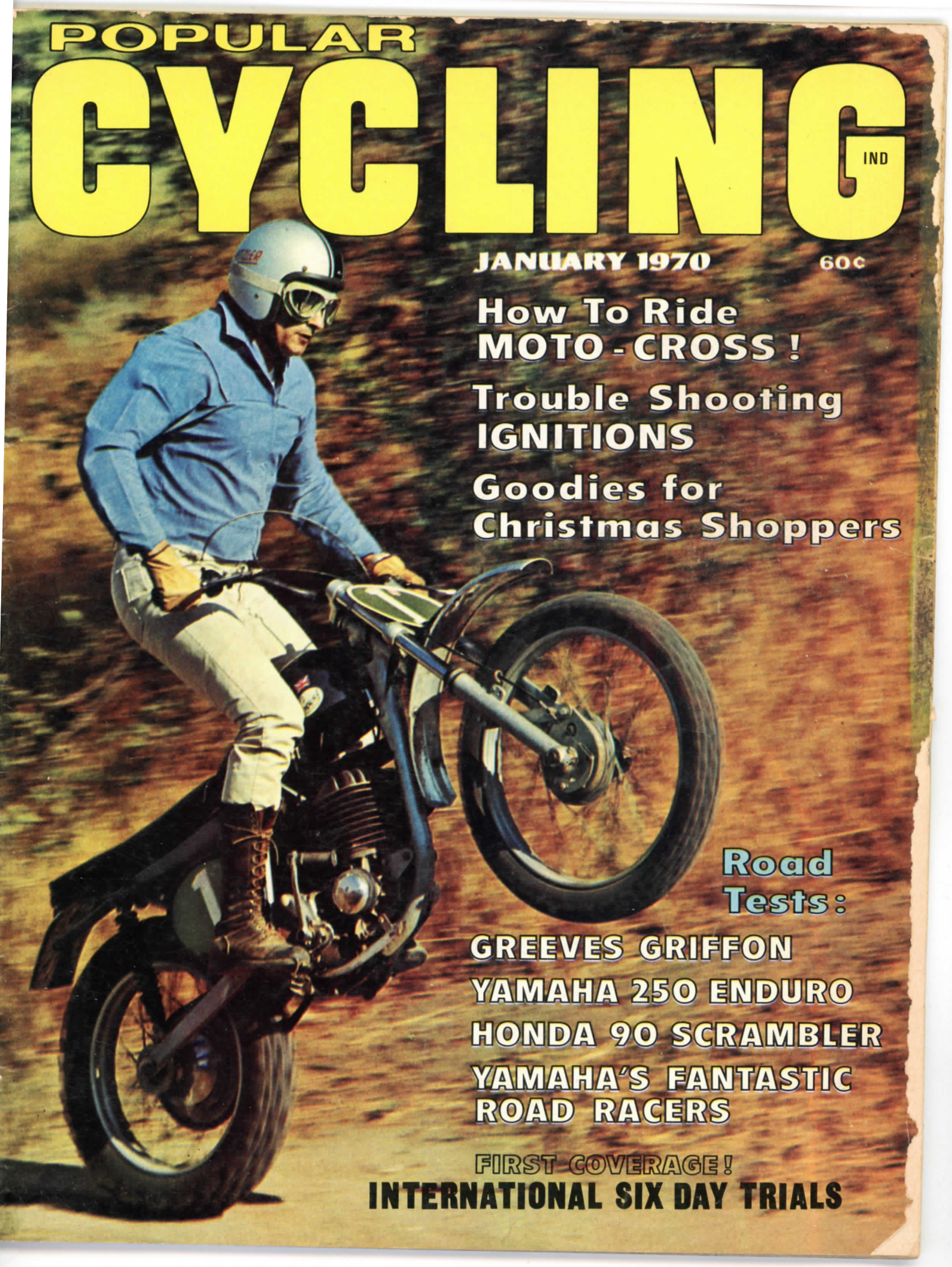
POPULAR CYCLING

IND

JANUARY 1970 60c



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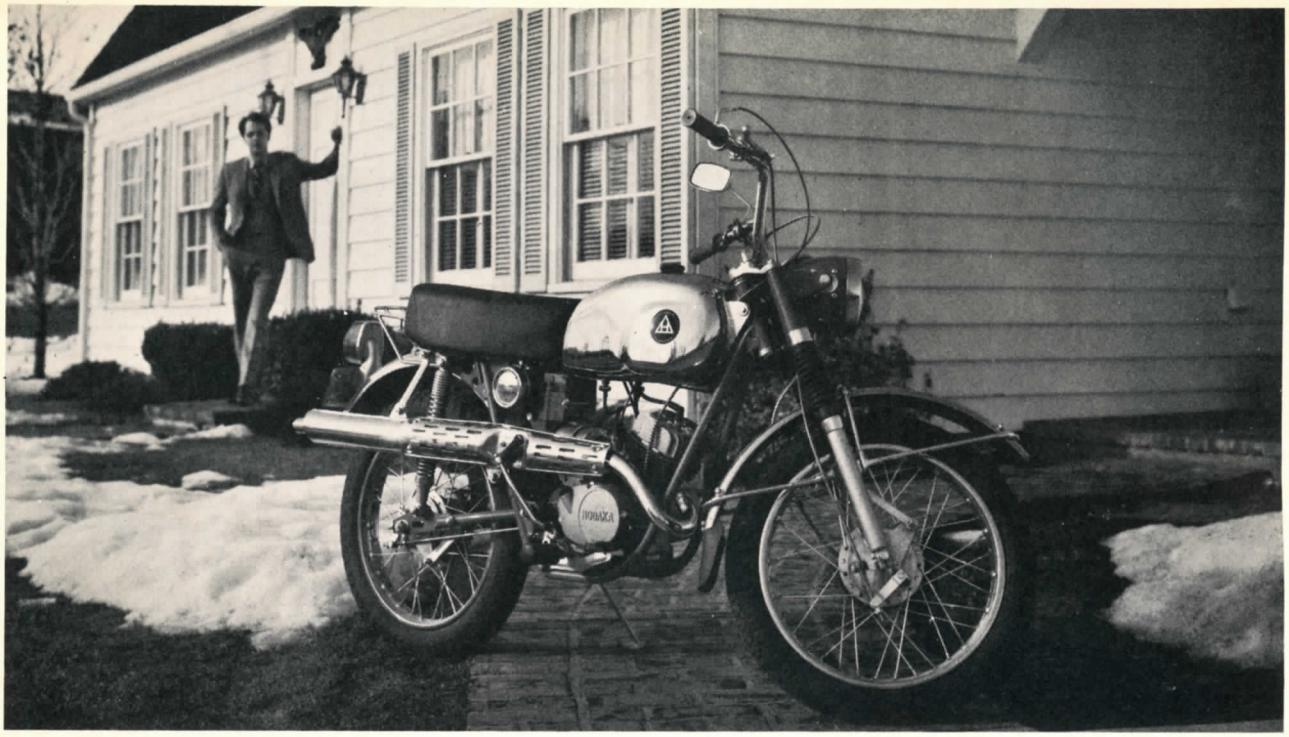

Hodaka '100' five-speed—$425 POE West Coast

For $425, this new Hodaka gives you more than just good looks

"While the other makes of motorcycles, large and small, dropped like flies from the pounding, the Hodakas went on, and on, and on."— Cycle Racing Annual Report of the 1968 Cochella Valley Hare Scrambles.

1. What makes the Hodaka such an outstanding motorcycle? "The word is simplicity," reports a noted test writer. "Six tools. Six simple, inexpensive tools plus a standard set of metrics are all it takes to completely tear down and reassemble this little masterpiece of design."

2. The first Hodaka was produced in 1964. Since then, over 140 improvements have been modified into the design. Many are small things. The kind multi-model manufacturers don't have time to notice. For instance, in 1968 we equipped the foot change ratchet plunger with an extra grease nipple. And designed a longer shoulder for the sprocket overlay bolt. Just two of the many modifications that help keep the Hodaka running longer, and faster than comparable makes.

3. Each Hodaka is engine tested and ridden before being offered to the public. Not every fiftieth. Or every tenth Hodaka. The Hodaka you see on the showroom floor is perfect. From flywheel to fender mounts, it's been tested and inspected. Not every manufacturer has the time to do this. But we do with the Hodaka. It's all we've got to worry about.

4. Most new Hodaka parts will bolt right on to earlier Hodakas. So if you're already a Hodaka owner, you don't have to buy a new one just because it's got more attractive clutch and brake levers. As one industry writer put it, "The old ones ran very well, it's just that—like the ads say—detail improvements offer just that." Parts interchangeability. We designed it that way. It makes Hodaka riders happier, and that's good enough for us.

5. More accessories are designed for the Hodaka than any single motorcycle model made in the world. Scrambling . . . desert racing . . . weekend trailing. Name your poison, there's a competition or pleasure accessory to suit any requirement. The Hodaka is built in only one size and model. Yet, with the number of modifications possible, it's become the industry's most versatile machine. Hodaka's full down-tube frame, light weight (180 lbs.), and standard five-speed transmission give it the basis for top performance in any event.

6. Past performance is proof. Many people ride the Hodaka for easy pleasure. But the proof of a great machine can be demonstrated only under the strain of competition. Hodaka has been the National Trailbike Champion the last three years, winning more events in its class (and many out of it) than any other trailbike.

In one California desert event, *fifty-four* out of the seventy-four 100cc class finishers were riding Hodakas. And won the first *ten* places.

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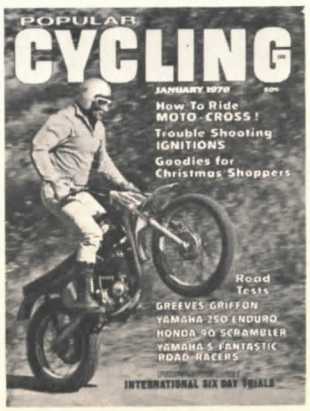
POPULAR CYCLING

JANUARY 1970 VOLUME 2, NUMBER 1



ON THE COVER: Editor Dave Hetzler wrings out the Greeves Griffon while Feature Editor Ed O'Brien takes the photo on Ektachrome X film with a Mamiya C-33.

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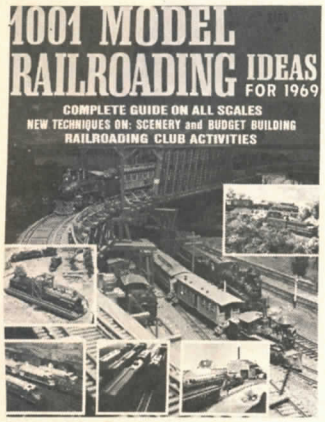
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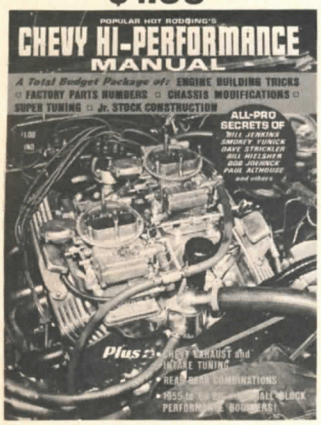

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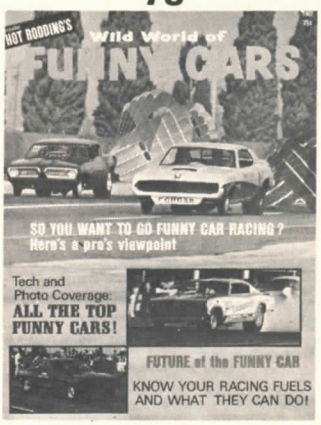
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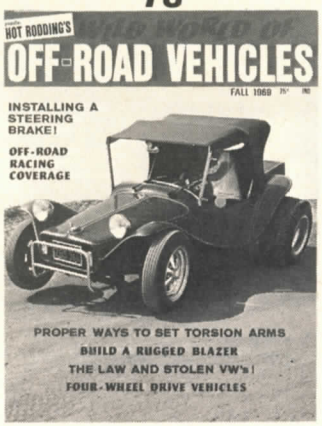

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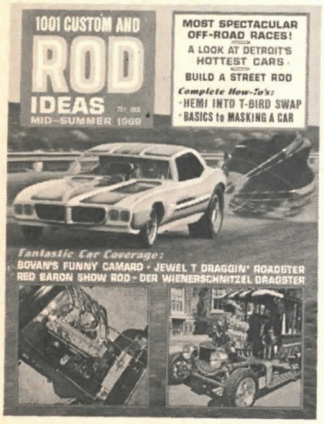
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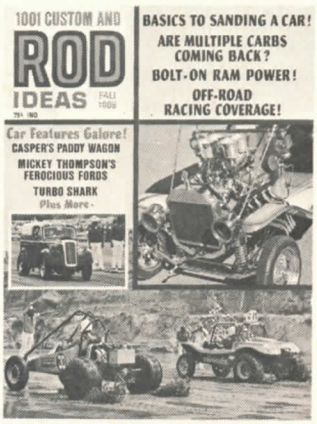

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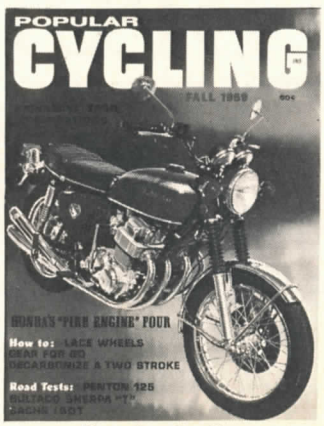

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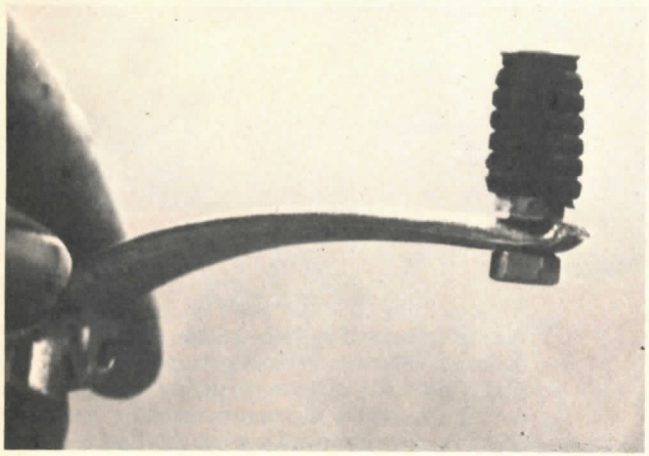
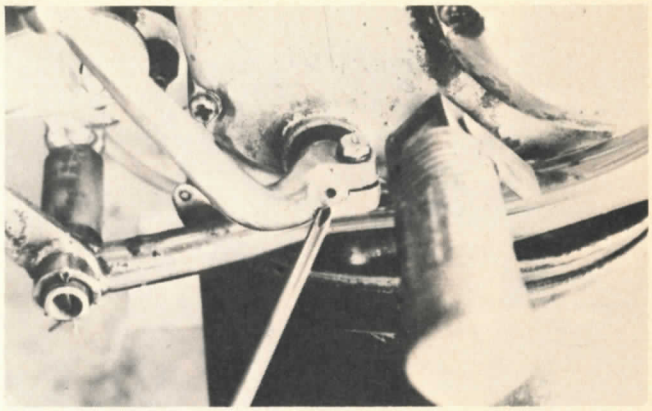
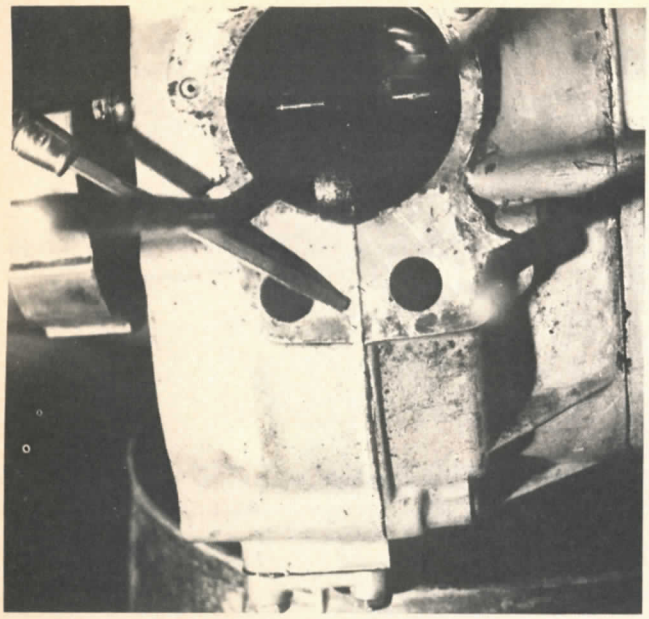


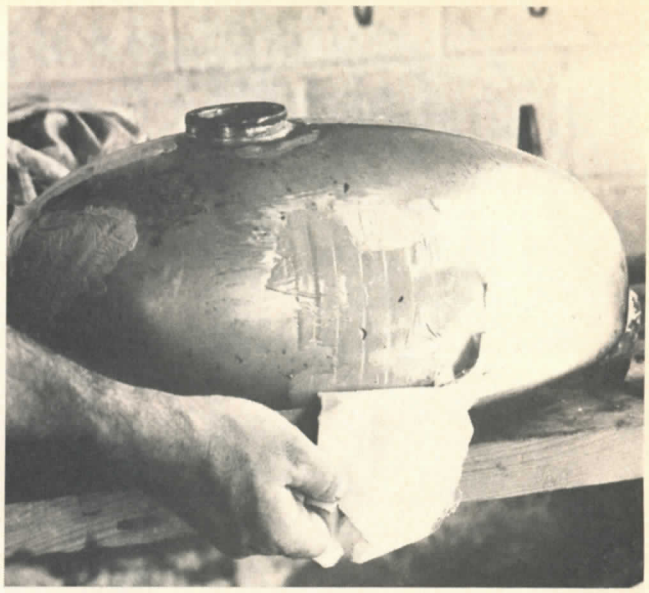
What to do when you've broken the end off of the shift lever? If you can, go buy a new one. That may not be as easy as it sounds, as the dealer may be fresh out of levers or you may be fresh out of coin. If for the above reasons, or any other cause, you want to fix the lever, you can go about it by doing the following; all you need is a ¼ inch drill, a 2 inch by ¼ carriage bolt and two nuts. As you can see by the illustration above, the lever has to be drilled through the end that has the missing part. The job is much easier if you first center punch the place where you want to drill. Next drill the hole as close as possible to the end so that you still have enough meat left on each side of the hole to provide some strength. Now take the carriage bolt and slip it through the rubber and secure it with one of the nuts. The bolt, the rubber, and the nut can now be inserted in the hole and secured with the other nut. A drop of loctite or weather stripping cement on the threads of the bolt keep the nuts from wandering. Another variation can be worked out if you have a welder handy. If you are fortunate enough to be in the latter category, you can use a plain bolt and insert it through the hole with the threaded portion facing outward rather than in. Now the bolt can be brazed in the hole and the nut screwed on the free end to hold the rubber. You will find this is usually stronger than trying to weld the broken piece back in place.



If you own one of the early Honda C200 or CT200 90 models you may already know that they have an inherent weakness where the shift lever attaches to the kick start shaft. What usually happens is that the retaining bolt works loose and this ultimately lets the lever slip on the splines. Once this happens, the edges are knocked off the splines of both the lever and shaft and you can tighten the retaining bolt until it breaks and there is no way the bolt can be made to do the job, without major repairs. We have seen a few of these engines running around where someone has gone so far as to weld the lever to the shaft. We can't argue that this method does not hold the lever to the shaft, but the seal behind the lever is usually ruined by the heat, and the lever has to be sawed off to replace the seal. If you have a problem such as this, try the following tip. The gimmick is to take a drill and drill three holes in the crack between the lever and the shaft. Drill deep enough to take a 1/2 by 1/8 inch machine screw. When the holes are finished, you merely screw the machine screw into the holes and these will prevent the lever from being able to rotate. You will need a drill the next size smaller than the screw you are using and the three holes should be equally spaced around the circle. Give it a try. The other alternative is to get a new lever and shaft and the cases must be split to install the shaft.



Do you have a persistent leak where the cylinder meets the cases of your engine? If this is your hang up, here's what to check for. These leaks are often caused by gasket material protruding from between the two case halves and this excess material can cause a ridge that will not let the cylinder base gasket seal properly. What causes this situation originally is that the manufacturers generally make the case half gaskets slightly larger than necessary to allow for any tolerance build-ups in either the case manufacturing process or in the cutting of the gaskets. This will dictate that the mechanic who assembles the cases must trim off the excess gasket material once the cases have been sealed together. Should he forget to do so, this will cause a protruding ridge of material that will interfere with the mating surface of the cylinder. If this is not the source of trouble, there are several other causes which should be checked while the cylinder is off. Look for any foreign particles that may be sticking to either surface which would prevent the base gasket from sealing. We tore into one the other day that had old pieces of a former base gasket stuck at random on the bottom of the cylinder that had been either overlooked or ignored by some former wrench weilder. Look for dents or marrs on the mating surfaces. We have even seen a rare occurance where the base gasket had been cut too short allowing the crack to develop when the gasket did not come up high enough to fill between the case halves. If there is a crack such as mentioned above, or a deep marr, it can be repaired by cementing a bit of gasket material into the marr, and then carefully scraping it smooth before slipping the base gasket into place.



A NEW PRODUCT, AND
AN EASY WAY TO USE IT.

Something new has been added to the selection of plastic repair filler materials. We are referring to Filled Epoxy putties that have recently come on the market. The most common filler that is now in use by custom shops and auto body repair facitlities is a ployester resin compound that contains a metalic oxide powder. While this compound is good for most applications and is universally accepted, we see some very good potential for the new epoxy. Shown above is the Filled Epoxy as used on a tank. The epoxy has the advantage of being tougher than the polyester filler. This makes it a good material for fixing tanks and the cycle tank has the bad habit of getting hickys all over it when carelessly parked at high speeds. The proper way to use the Filled Epoxy material is to first clean the surface to be filled to the bare metal and then mix the epoxy and hardner 50-50, equal amounts of each. Now the epoxy can be spread in the dented surface. Here is a helpful idea that we picked up, since the epoxy will want to creep for a while until it starts to set up, you can lay the tank so that the dent is facing upward and the epoxy is settled in the lowest point. Now spread a smooth piece of Saran Wrap or similar plastic sheet over the epoxy and tape into place with masking tape. This will hold the epoxy firmly in place and let you move the tank around or work on another area without waiting through the set-up time. Once it has cured, the Saran Wrap keeps the epoxy from sticking to the tape and you can peel it all off. Any small irregularities or bubbles can be quickly filled with more epoxy or with spot putty and the job will soon be ready for paint.

Since bikes often ride on trailers, and trailers are pulled by generally some larger vehicle, you will see the connection between a cycle technical tip and the ball shown above. Actually, you are asked to look a little closer and observe that the threads are missing from one side of the securing bolt which held the ball. How it got that way happened not long ago when we were returning from a riding expedition with trailer in tow when we suddenly heard a sickening, grating sound. We looked back to see the trailer and bike make a sharp right run off into a power pole. For the next week we got to play the game known as fix the funny bike. The ironic part of all of this was that we had purchased this ball new when we left on the trip and had checked it to be sure it was tight. What foiled our plan was that we did not grease the new ball which was also covered with paint. When the hitch was clamped down on the new paint, the hitch clung to the ball instead of runing on it. The side to side movement of the ball soon worked the nut and lock washer loose, and zip – we had a custom bike. Another thing which happened, and shouldn't have, was that the safety chain let go when the tongue of the trailer dug into the pavement, but that's the way it went. The thing to be learned from all of this is to lubricate the ball, especially if it is a new one, and then tighten down you hitch firmly, but not so tight as to prevent it from being able to work normally on the ball. Double check all the links of the safety chain. We are firmly convinced that this beats the sox off of trying to iron the wrinkles out of your machine.

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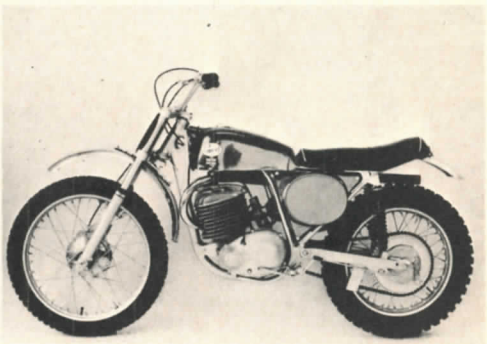

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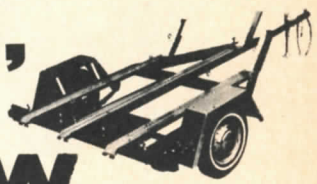

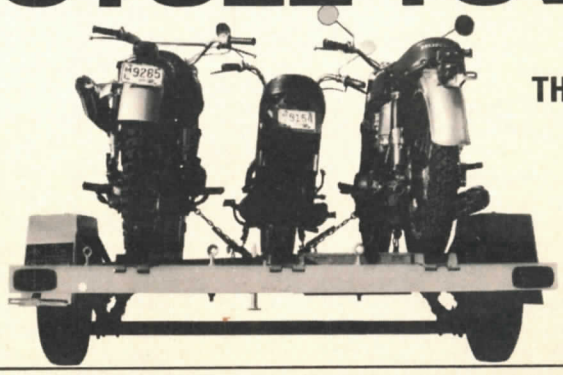

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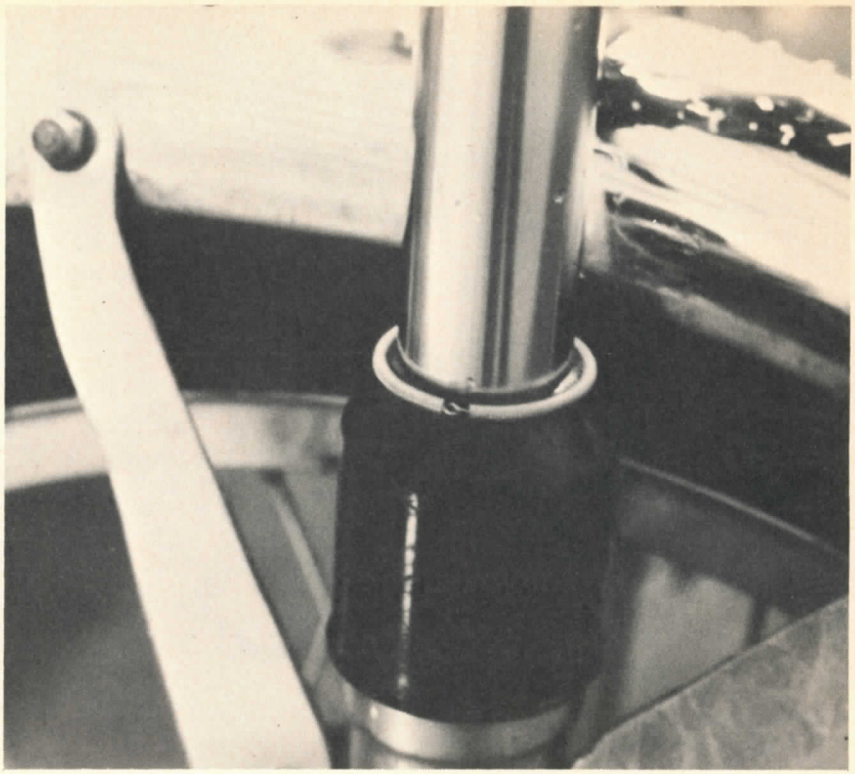

The owners of the machines that have the short dust covers sooner or later find they have a leak occurring in the fork tube seals. This will cause the owner to cuss the seals a lot, but actually the short dust cover is partly to blame. The whys of this are found in the fact that the short cover allows dust, muddy water, mud, etc. to collect on the fork tube and this eventually works the top of the cover and damages the seals. The primary reason for the short cover, as opposed to the accordian "boot" style of cover is that on long travel forks, the accordian boot covers tend to balloon in and out unless air holes are cut in them; if the holes are very big, they will still allow crud to get inside and the problem returns. The boots are also heavier than the short covers.

Here is an idea which helps lengthen the life of the seals. Ossa now uses the retaining spring on their machines, and you can do the same for the Bultacos which have the large diameter fork tubes. All you need is two of the springs some models of the Honda, 90 and 305, use for air hose clamps. These are the right size to fit around the top of the Bultaco covers. The Bul covers have a ridge that keeps the spring from sliding up and off. If the springs are put on when the temperature is warm, 70 degrees or more, the spring will make a indentation in the soft cover material and this helps hold them in place. Even if the fork seals are already weeping some, you will find that these two springs will cut the leak way down.

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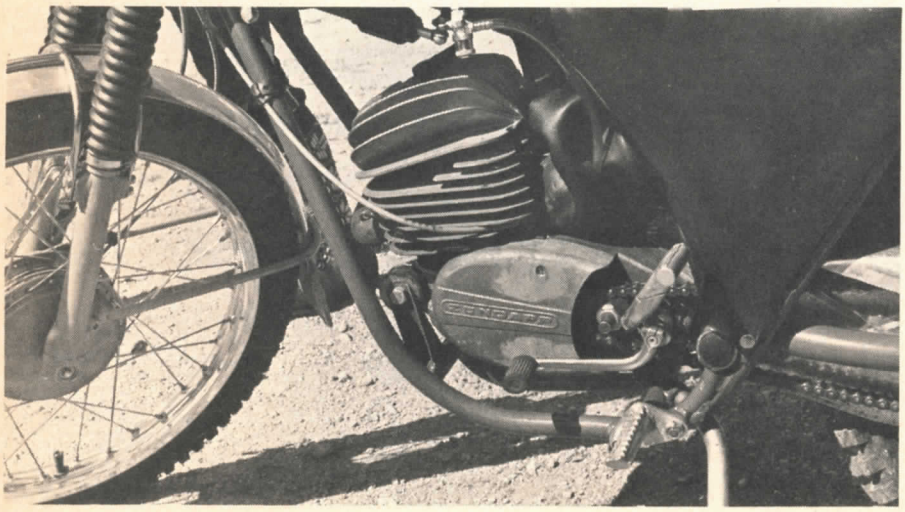
a different view

Editor's Note: Our fearless Contributing Editor, Preston Petty, rode this year in his first International Six Day Trials. The following is his letter to the staff of Popular Cycling after the race was over. Much to his credit he won a silver medal, the second highest award possible in this grueling event. We thought you'd be interested in a rider's-eye view of the race, hence the following humorous, day by day account of his trials and tribulations.

Author Preston Petty discusses a rough part of the course with his sponsor Ted Lapadakis.



The new Zundapp was ridden by some of the American riders, namely Dave Ekins.

We arrived in Frankfurt, Germany, via a charter flight direct from Los Angeles. That same morning we rented a Hertz German Ford and headed for the Maico factory near Stuttgart. We stopped in the beautiful little university town of Heidleburg for a meal and "Bier" in one of the ancient "pubs". We arrived at Maico in the evening and set out to find a "Gasthaus" for the night. Early the next morning John Rice arrived at the factory and met with the sales manager and chief development engineer. We rode the prototype 45 horsepower (honest) 480 cc Moto-cross machine and were very impressed. This factory is very dynamic and will become a leader in every class that they contest.

That evening we left for Garmisch which is in southeastern Germany, and the base of the ISDT for 1969. The following two days were used for getting familiar with the 125 Sachs and the Bavarian terrain. The area around Garmisch looks a lot like Grand Teton National Park. On Saturday, September 13, from 4 – 5pm, had been allocated for impounding of all the American's machines. An hour or so is allocated for check-in of each country participating. Once the machines are impounded they cannot be touched until 10 minutes before the start on Monday, September 15. Each of the riders are supplied a folder of maps for each of the six days, time table, beautiful porcelin-brass IDST plaque and a program.

Before I try to give you a day by day account of what happened, I should explain how the ISDT is scored. First, the event was originally conceived as an endurance trial for both bike and rider. Everybody is a private entry who may batch together with other riders to form any one of the four types of teams. They are Vase A, Vase B, Trophy and Club teams all

10 Photos by Maxine Petty and Webco Inc.

of the ISDT

PRESTON PETTY TELLS HOW TO ABUSE YOUR BODY IN SIX EASY LESSONS

Preston Petty gets ready to start the second day. In front of him is an unidentified German rider.

consisting of four riders each. The daily schedules are somewhat like an enduro in that explicit times are given for each check point on the course. A rider will lose points if he is more than three minutes late and also will lose bonus points if he arrives early. Bonus points are given based on a rider's fastest time over a timed section of the course. There are no "secret" checks as in an enduro and all time checks have a large clock showing the "key time." It is only necessary for you to arrive early and wait for your minute to come up and then cross the line and get your card stamped with the correct time. I think that what makes it so difficult is the length of the event (six days) and the rocky muddy sections that one can get stuck in. If a rider is over an hour late to any check for the six days, he is disqualified. If a rider completes the six days without losing any points and completes the speed sections in no more than 25 percent more time than the fastest rider in his class completed them he is eligible for a Gold medal. A silver medal is awarded for a rider who has not lost more than 28 minutes total throughout the six days and within 100 percent more time on the speed sections. A bronze medal is given to the ramaining finishers. All machines 100-1000 cc must maintain the same speed schedule.

Monday, September 15

This day is 78.15 miles per lap and two laps long. A map of each day is

provided and the bad sections are labeled accordingly. My number was 122, meaning I have to depart at 7:11 in the morning with two other riders, John Rice number 120 and a German whose name I've forgotten.

There was more mud the first day than any other day. It is always fun to motor across a meadow in third gear and have the bike stop in about one foot, however, it still requires the same 15 feet for the rider to stop. The sun was out and most of the Americans had a good day.

Tuesday, September 16

It had rained the night before just to make sure that the mud would be very difficult. Shortly after the start I was stopped on a rocky muddy hill with about ten other riders. Fortunately, the German spectators are very helpful and will leap into the quagmire to assist a stalled competitor. After a physical relapse at the top of the mountain, we had the fun of going down the wet clay-surfaced side for about 1,800 feet. It is always exciting to me to have both wheels locked up, both feet dragging, gaining speed rapidly in the slick mud and a sharp turn coming up. What did I do? I crashed! With the additional drag of my elbows, handlebar and footrest the machine finally stopped before the turn. This process was successfully repeated a half a dozen times before I got to the bottom. Although I had a clean day (not dirt wise – point wise) many of the Yanks had their share of trouble. John Rice was over an hour late and was consequently disqualified. Bob Ewing and Ted Lapadakis dropped with mechanical difficulties during the 153 mile ride.

Wednesday, September 17

The course for today is the reverse of yesterday's without the muddy downhill/uphill section. One thing about the Germans, if it is definitely impossible they won't try it. In many places where the trail went across a

Adojan Wiktor of the Soviet Union turned in a good ride and was one of the Russians that was exceptionally friendly toward the Americans.

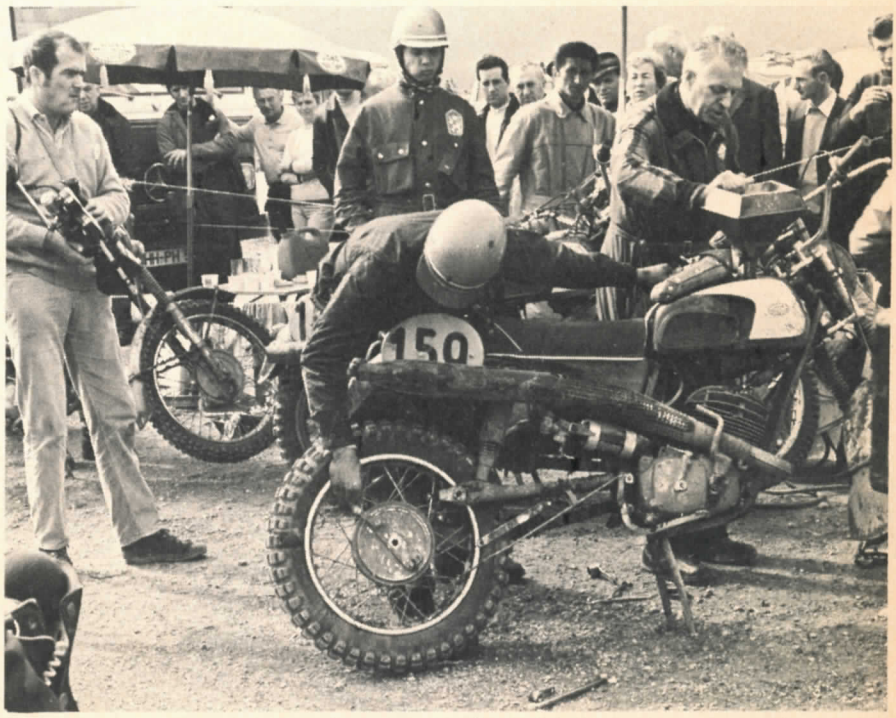
A Maico does its stuff with a tired looking rider in the saddle.

Dave Ekins cleans a rough section and heads on to the next. Dave, a previous Gold Medal winner, had his share of troubles this year.

mud bog, they have laid logs crosswise on the trail so you won't sink into the mud. It is interesting to note that the muddy logs are twice as slippery as the mud and much harder when embraced by a rider. The muddy wooden bridges are also great for dirt track-type slides followed by moaning from when the wood splinters are pulled from the anatomy. I also found out that the roots of trees are made out of wood and also covered with mud which provided me with endless hours of enjoyment. Most of the trails are used for walking (hiking!) and are not normally open for bikes. I was amazed to see how much the Germans love to hike. I frequently saw senior citizens miles from nowhere hiking next to the course, many wearing a tie and sport coat.

Thursday, September 18

By now my muscles have given up on me, yesterday they just ached a lot but today they became numb from lack of sympathy. Copious rain the night before and the cloud shrouded mountains presented a dismal picture. It was a new course and the bad areas were down to a handful. The best parts of the course were where it went through the thick woods with the trail being made out of decomposed granite and mulch – a lot of humps, jumps and banked turns – really great riding but it was only 10 to 20 percent of the course. Again the course was two laps but 30 miles longer for a total of 183 miles. This is where I lost my Gold medal. There was a very tight section (timewise) and I missed a turn-off which cost me two points (0 = Gold, 1-25 = Silver). The next lap I rode as fast as I could (ala moto-cross) and barely zeroed it. At this point only two Americans are still on their Gold – Malcom Smith (Husqvara) and Billy Uhl (Sachs). Mike Patrick (M.Z.) was a previous Gold medal winner but lost just one point this time.



Ten minutes are allowed before the start each day for making necessary repairs to the machines. Here a rider is changing a flat he received the previous day.

Friday, September 19

Again the course is the reverse of

yesterday's, but it is considerably slower because of the chewed-up muddy sections. Rain and fog were present just to spice things up a bit but the ride was completed okay.

Saturday, September 20

This was the final day with a short 78 mile course of only one lap. There was a speed contest (road race) at the

The start of the second day shows the fog and rain hanging over the course.

The Germans know how to pick pit crews.

Ted Lapadakis hoists his Gatorade, provided by Webco Inc., and toasts an Englishman and two Belgians. Ted dropped out on the second day.

This is how one man who was there felt about our ISDT team. We couldn't have said it any better.

Neil Holt and Al Baker take a break from the action. Webco Inc. introduced Gatorade to Europe and most of the foreign riders went wild over it.

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October 2, 1969

Argus Publishers Corp.
131 Barrington Place
Los Angeles, Calif. 90049

Letter to the Editor:

During the past year I have had two moments during which I was immensely proud of being an American. One, our landing on the moon and the other, our American motorcyclists at the International Six Day Trials in Germany.

What our riders accomplished in Europe cannot be thoroughly realized by Americans at home. To credit the performance of one rider over another regardless of his final standing is unfair. Every rider we had at the ISDT was magnificient. What is more amazing, the riders and spectators from all over Europe thought we were magnificient.

Please allow me to offer my very sincere and heartfelt congratulations to every team member representing the United States. I am very proud of being an American and equally proud of being associated with American motorcycling.

Very truly yours,

Tom Heininger

WEBCO INC.
Tom Heininger, President

mh:

MEMBER . . . MOTORCYCLE, SCOOTER & ALLIED TRADES ASSOCIATION, INC.

end of the event. Each rider must complete five laps within a specified time if he is to do better than a bronze medal. The first two laps are for bonus points with the fastest rider getting maximum points. Malcom Smith held a strong third place for the first two laps and then backed off to save the engine so as not to jeopardize his gold medal. The father-son team of Herb and Billy Uhl from Boise, Idaho, were highly praised by many because they rode two minutes apart for the entire six days and netted a silver and gold, respectively in their first ISDT. The East Germans (DDR) won the team prize and consequently have the option to hold the event next year. I also heard rumors of Spain hosting it.

No matter where it will be, it is a great international event that all the American riders were proud to participate in. You get a chance to meet with riders from 17 countries and, maybe, like Herb Uhl, swap your American helmet for a unique Russian helmet. (Imagine, the first one on your block with a genuine Russian Crash helmet.)

Many of the trails used for the race are normally the domain of the hiker.

While running on the roads found in the ISDT, one has to watch out for trains, shown here, and horse-drawn carts.

THE GREEVES GRIFFON

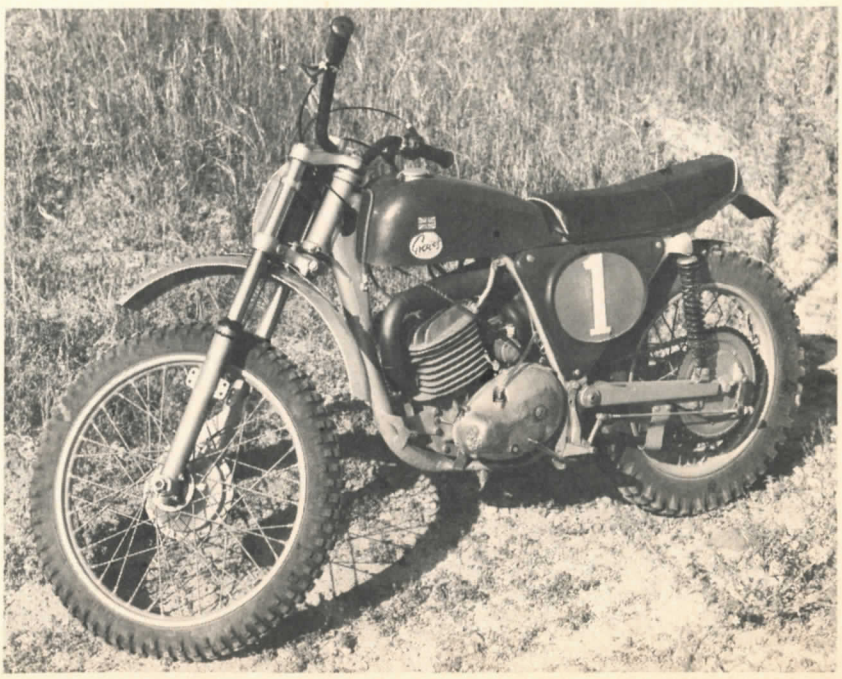
A MOTORCYCLE FOR ALL SEASONS

By Dave Hetzler

The quiet revolution started about six or seven years ago. Before that time all the desert races were won by the big fire breathing 30 and 40 inchers. Then things changed. First one, than more English 250cc machines made their appearance on the starting line during those cold, wind-swept mornings. At first the knowledgeable people laughed. Who ever heard of a 250 beating the big jobs? Soon the laughter was out of the other side of the mouth, not only were the 250's beating the big bikes, they were beating them bad.

So what?, you ask. What's all this got to do with a road test of a Greeves? Well by now the light should be breaking, all those lightweights were Greeves.

In the immediate years after the revolution started, Greeves were Kings of the Hill. And then things started to go downhill. Other countries were bringing out lightweight machines that



The look of the Greeves is changed with the advent of the new tube frame.

had more power than the Greeves. From Sweden, Spain, England, Germany, and even Japan came this horde of lightweight screamers and the Green machines from Thundersley, Essex fell into the background.

The reason for this fall wasn't because the Greeves didn't handle. More than one top line rider riding another make of machine didn't hesitate to state that the Greeves was the best handling cycle ever built. Their main drawback was the fact they plain lacked horsepower. Greeves was still running an undersquare engine while all their competitors had long ago made the switch to the oversquare, high revving, but still torquey, mill that is so needed to produce the power necessary to win on the moto-cross tracks.

But as things are wont to do, the pendulum once again swung toward Bert Greeves brainchild. This year Greeves introduced The Griffon model and all of a sudden Greeves was winning moto-cross races left and right.

What's the reason for this rapid turnabout? First and foremost, and the biggest surprise to Greeves followers, is a new frame. Gone is the familiar "I" beam aluminum single down tube unit that became the Greeves trademark.

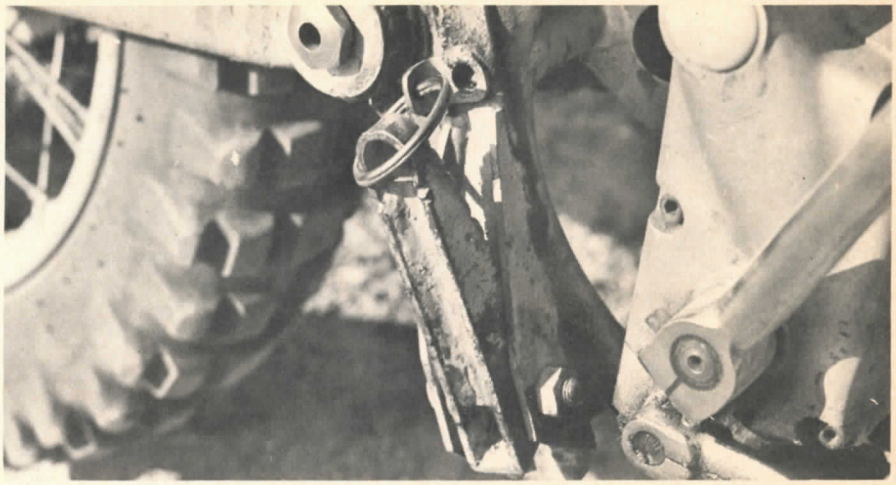
The new frame is made from Reynolds 531 steel. The main tubes are 1-3/4 inch, the duplex loop 7/8 inch and the rear assembly, supporting seat and rear suspension legs are 3/4 of an inch. Large gussets are at all stress points; in short, this frame should stand up under the hardest punishment it will receive.

The frame is one change but the biggest difference can be found in the engine and transmission department. The Greeves engine has been redesigned to an oversquare ratio of bore and stroke, 70mm bore and 64mm stroke, combining for a displacement of 246cc. Claimed horsepower is 28.5 at the crank at 7500 rpm, more than honest in our opinion. The Griffon performs as well, or better, than machines that claim three or four more ponies.

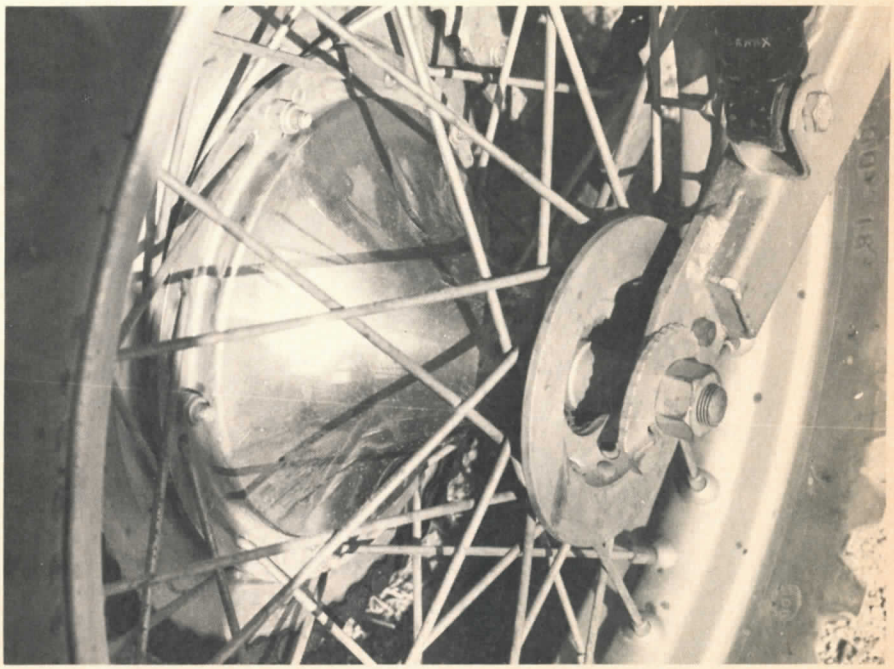
Low rpm torque is the name of the game in moto-cross and the Griffon scores here. The engine pulls strong from approximately 2000/2200 rpm and there's no strong, unsettling surge when the mill comes onto the pipe around 4000 revs. All these figures are educated guesses since the bike has no tach, the point we're trying to make is the fact that the bike pulls from very low revs.

The carburetor for the 250 is one of the 32mm 900 series Amal Concentrics. With this the bike shows no tendency to either load up if the engine is killed or when the bike is ridden slowly, as in cowtrailing.

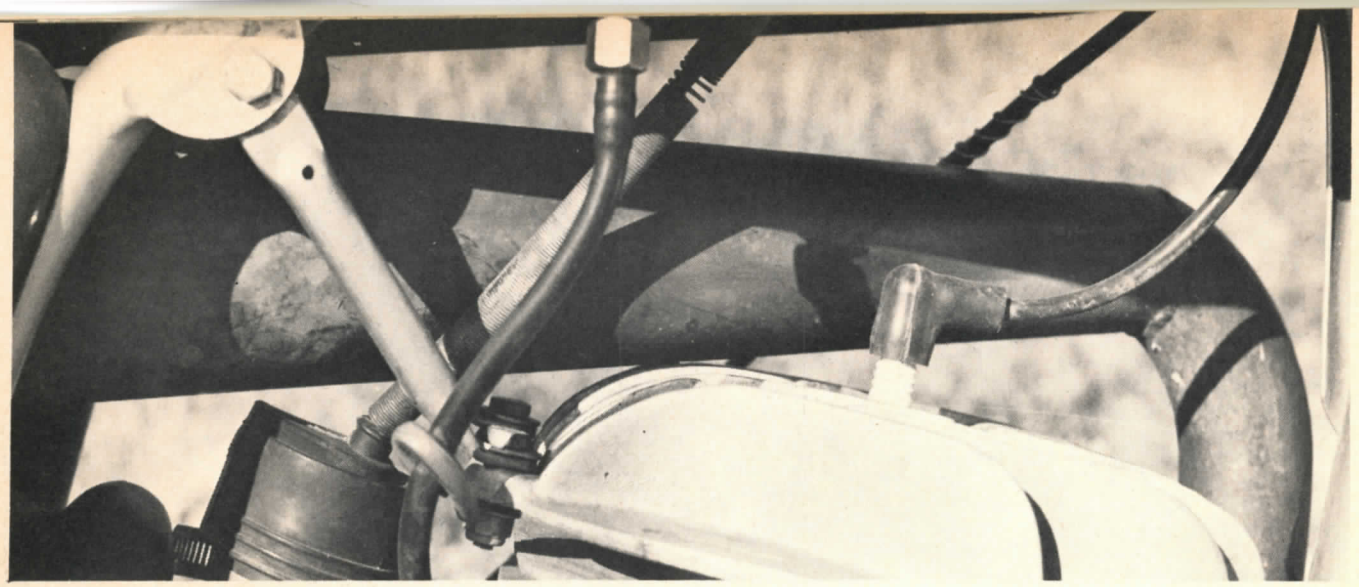
New too to the Griffon is the transmission and clutch. The four speed gearbox, altho retaining the Greeves-Albion gear clusters in the cases cast at the Greeves factory, is



This little ring is the answer to sore arches received when trying to kick start the bike on a cold morning. Simple, but it really works.



To reduce the unsprung weight Greeves has gone to conical hubs both front and rear.



The new top engine mounts are a real advantage when cutting down engine vibration is desired.

The small magneto is fairly waterproof with the inclusion of the rubber band which holds the cover on.

Ceriani forks are used instead of the old style leading link arrangement.

seven pounds lighter than the previous model. The big change is in the selector mechanism.

Instead of being moved by a barrel cam, as before, the two selector forks are mounted on a slider rod in front of the gear shafts and are actuated by various slots in a selector plate.

There are two manganese bronze slider blocks which allow the plate to move vertically on a guide rod. This selector plate handles all of the various functions; indenting the gear positions, tracking of the selector forks, and carrying the slots by which the gear selection is obtained.

The whole unit is very strong with the added plus of being lighter without the reduction of size of the gear clusters.

There are 14 plates in the new clutch, seven being steel, seven being hard brass. Deep notches in the steel drivers retain oil and keep the heat down when the clutch is being used hard.

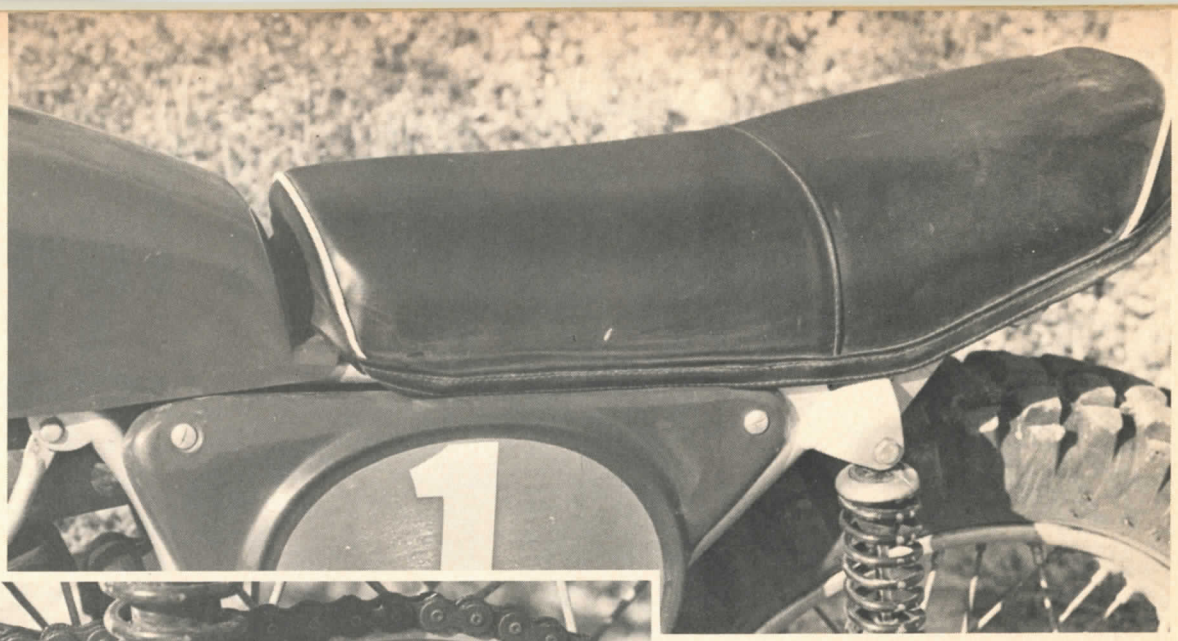
The 250 Griffon is finished well for a race bike. The approximately two gallon gas tank is the familiar fiberglass unit with the green color impregnated in the resin.

There is little chrome on the bike; even the handlebars are painted black. However, one must remember that this bike isn't built for looks, it's built for winning races and in this capacity the Griffon is hard to fault.

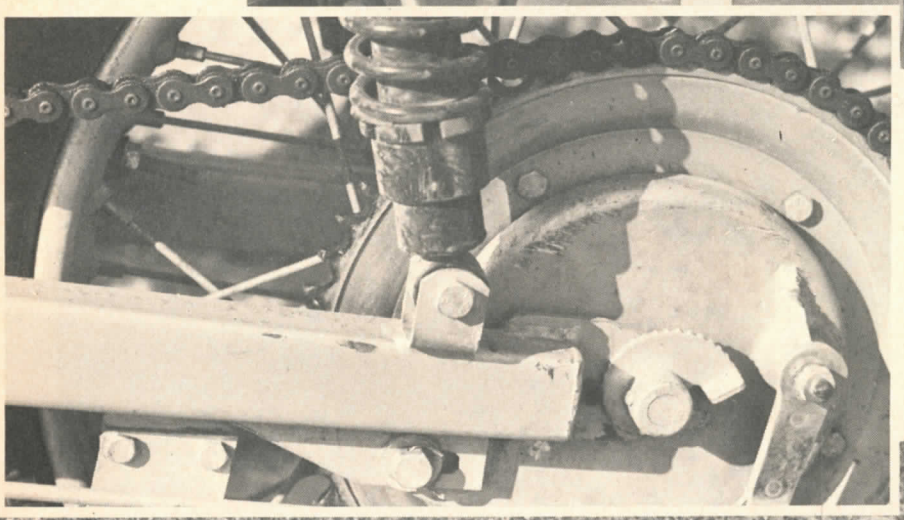
Helping the bike in the rough is the well-proven Ceriani front forks and the outstanding Girling three way adjustable rear shocks.

After our test we came away with the feeling that the Griffon needs very little more than what it already has. An example of Greeves' desire to build a pukka racer is the little ring that resides by the kick starter. Designed by Lloyd Lingelback, the American importer's parts manager, this ring holds the right-hand foot peg up while the bike is being started. This keeps your foot from having relocated arches from bouncing off the peg. All you ex-Greeves and Bultaco riders will know what we mean. It's a nice touch.

Yep, all the Greeves Griffon needs to win races is you – the man to turn the throttle.

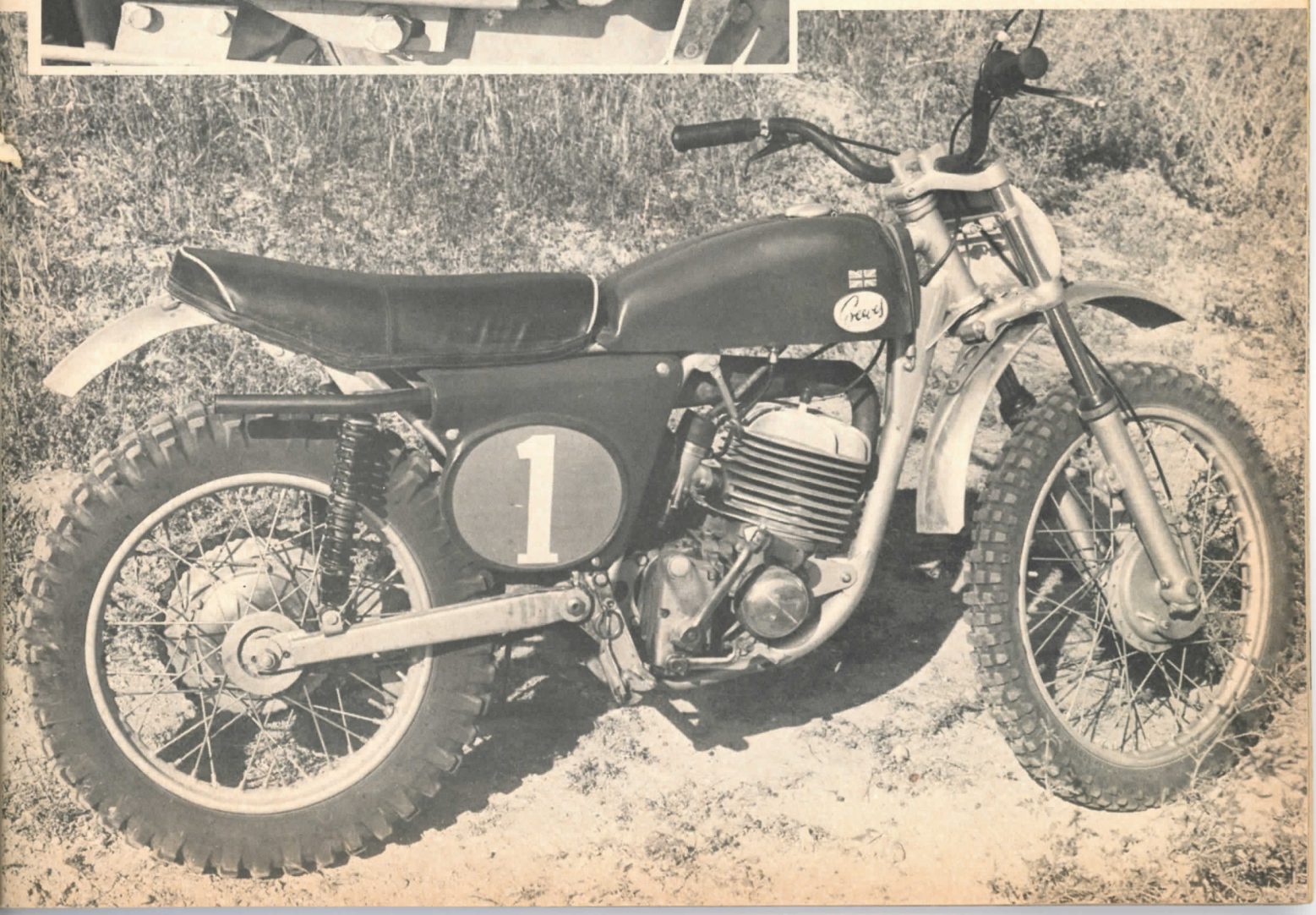


The seat is comfortable enough for moto-cross but could stand more padding for desert racing.



The swinging arm is boxed for strength and a cam-type chain adjuster is used.

The exhaust pipe tucks well out of the way, running underneath the gas tank and seat.



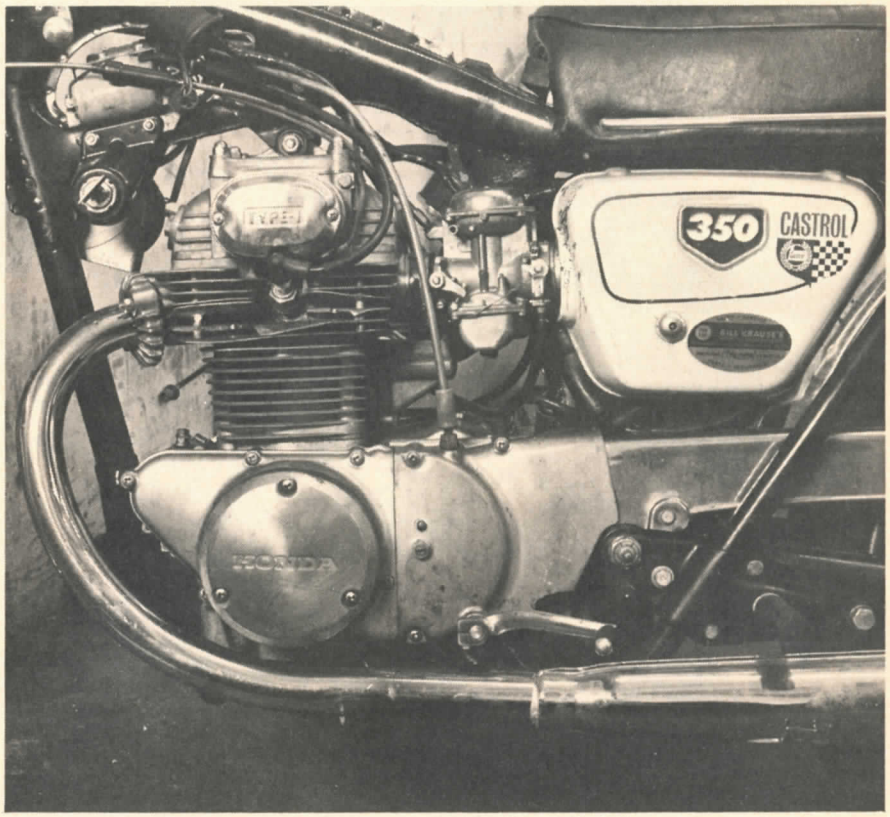
Four Cycle Top End Tune-Up

A LITTLE TIME AND LESS MONEY WILL RESTORE THAT SHOWROOM-NEW POWER

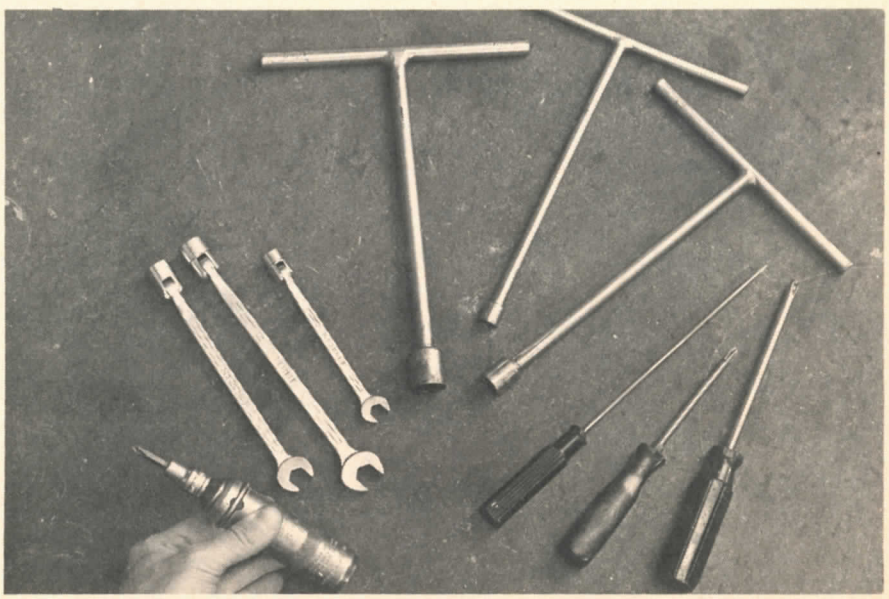
Modern motorcycles are engineered for extensive reliability and wear before a rebuild is required. If you own one of Honda's versatile twins that seems to be down on power, this simple overhaul of the valves, valve seats, cylinder bore, and rings can make your machine as powerful as it was when new. Most operations can be performed with a few simple hand tools – and you can save a goodly number of bucks, as well as enjoying a good number of hobby-hours, learning what makes the engine tick. The photos show how the job is done on the 1968 Honda CB350, but most Honda twins utilize similar construction – obtain a shop manual on your model to check out any differences in procedure. Even if you're doing this exact same work on a '68 CB350, buy a shop manual to double check clearance dimensions and to tune the bike when you're finished refurbishing its internals.

The particular CB350 used for this series of photos has received more than its fair share of wear. Dave Albee, Service Specialist at Bill Krause's Motorcycle Department Store in Inglewood, California, actively races this machine in ACA and AFM "Production"-class road races. The super-strict rules force the machines to be dead stock, right down to street legal mufflers and exhaust systems. Dave has moved the footpegs to a position about three inches forward of the passenger peg location for a more comfortable "tucked in" riding stance. The gear shift lever is reversed, kick starter lever removed, and a rear brake linkage modified from a Honda Super Hawk installed. Albee has picked up about eight first place trophies with the machine in nearly 20 events – the rather "modified" cylinders attest to at least one trip to the tulles, or worse. The machine is more than competitive in the "350-Production" class, with over 110 mph top speed capabilities.

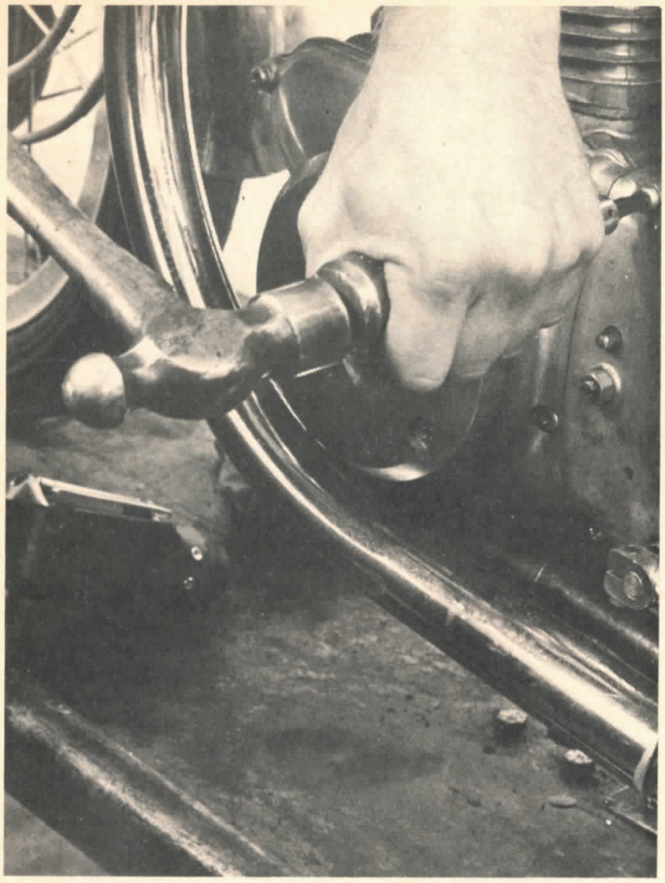
By Robert Schleicher



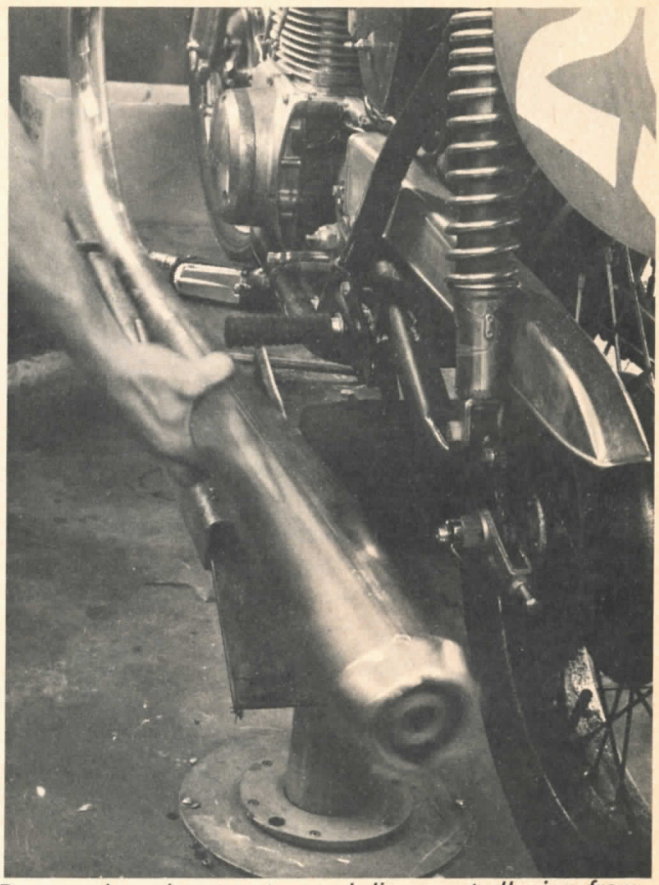
Dave Albee's '68 Honda CB350 was the "guinea pig" for our top end overhaul.



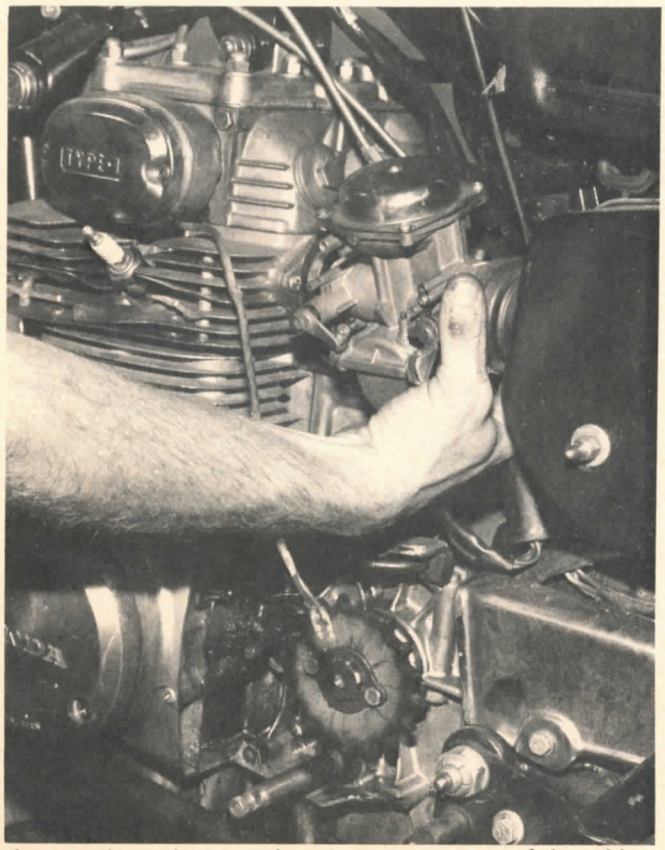
You'll need an impact screwdriver, 10, 14, and 17mm Tee wrenches, 10, 12, and 14mm swivel/socket combination wrenches, No. 2 and No. 3 Phillips head screwdrivers, a flat bladed screwdriver, and access to a torque wrench to do the job with ease.



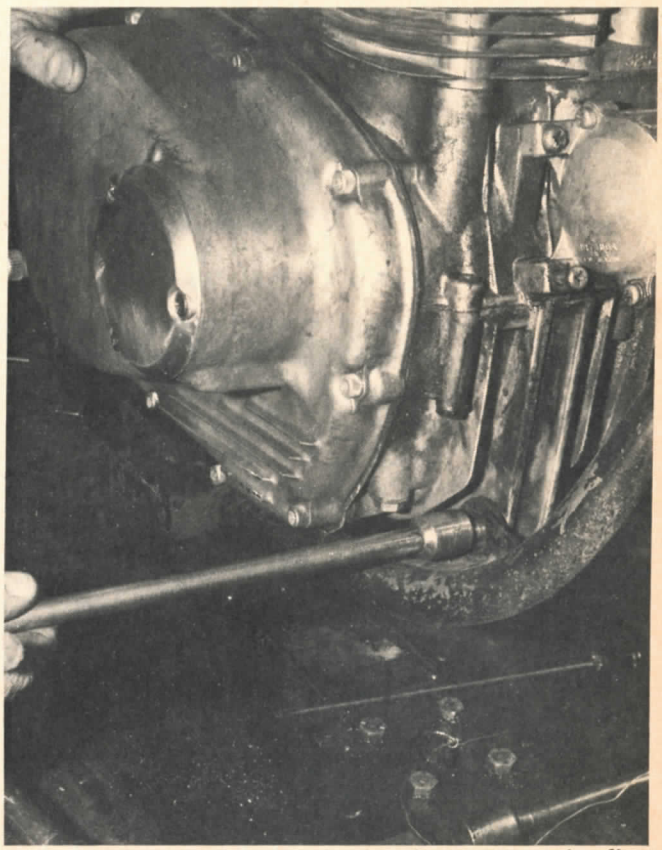
Remove the shift lever, then loosen the Phillips head screws on the sprocket cover with an impact driver and remove.



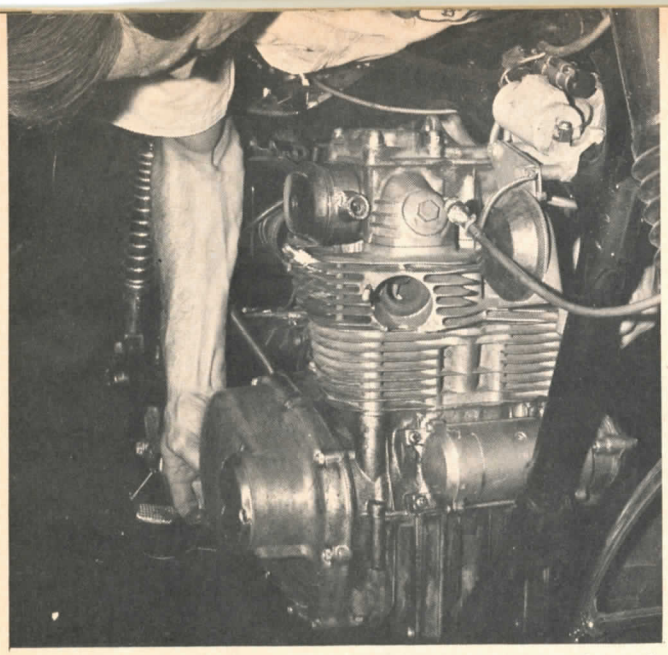
Remove the exhaust system and disconnect all wires from the engine to the frame. Unplug the magneto wire "Cannon" plug.

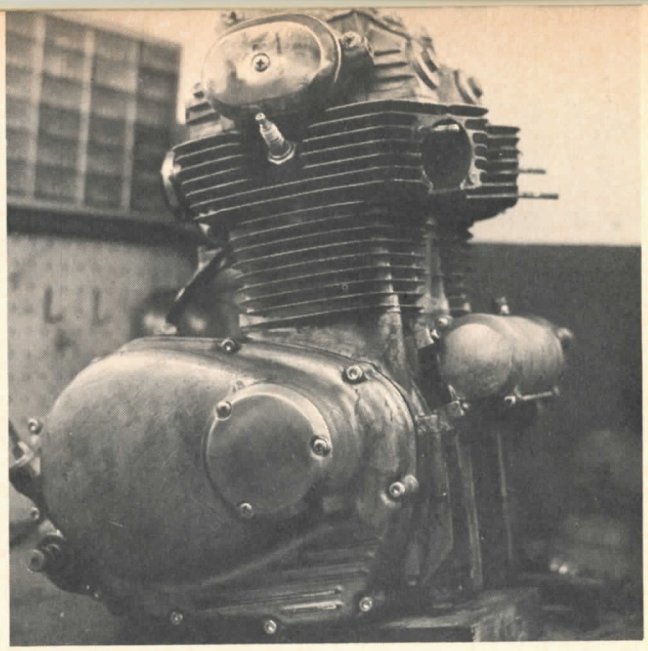


Loosen the carburetor clamp screws, pry one of the rubber connecting hoses aside, and wiggle each of the carburetors free.

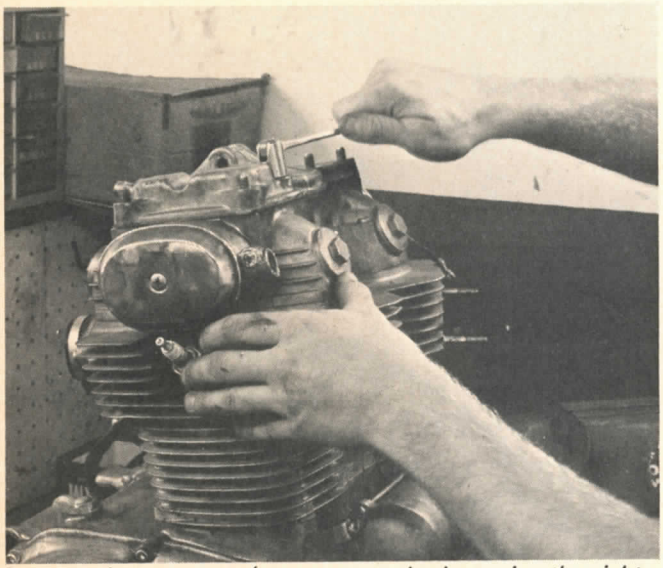


Disconnect the tachometer cable, then remove the five motor mounting bolts. The engine should now be free in the frame.

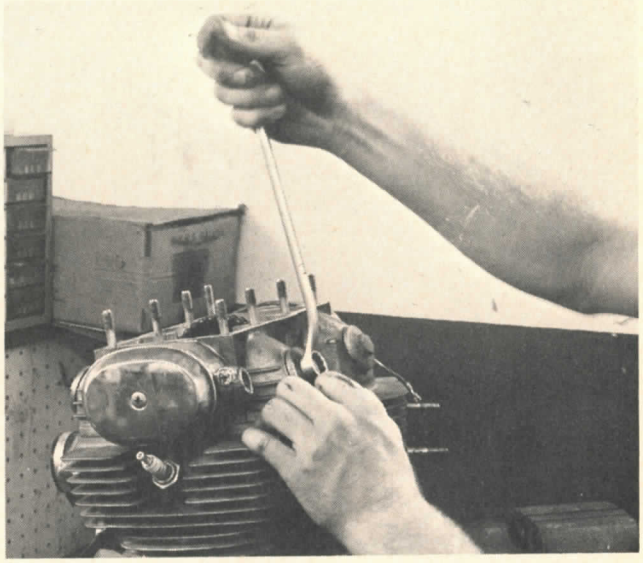




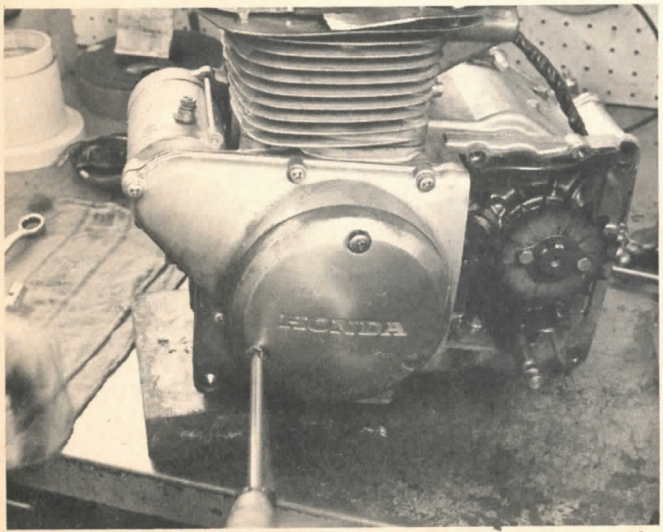
Wiggle the engine free of the motor mounts and block up the crankcase on the workbench for further disassembly.



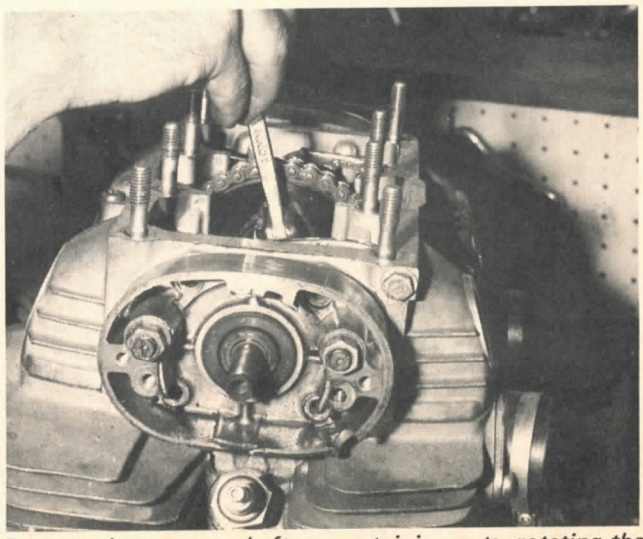
Remove the cam cover/motor mount by loosening the eight head bolts that retain it. Tap cover to loosen gasket & remove.



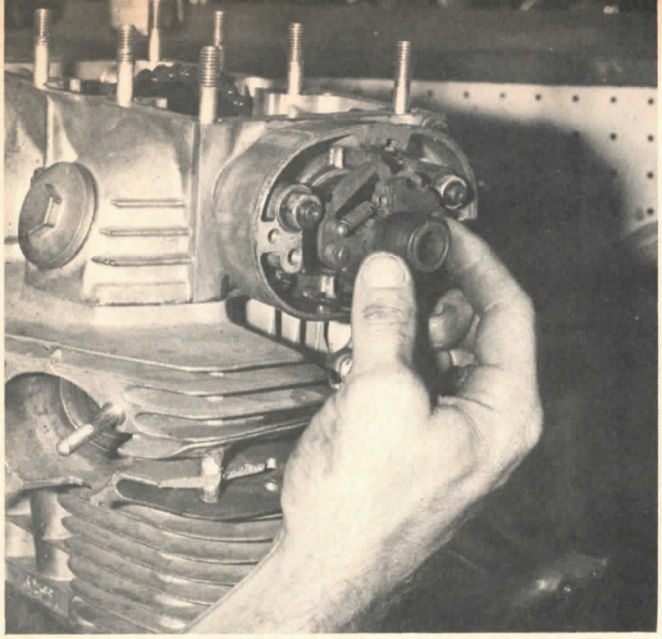
Remove the rocker arm adjustor covers and reach inside to loosen the rocker arm adjustor adjusting nuts themselves.



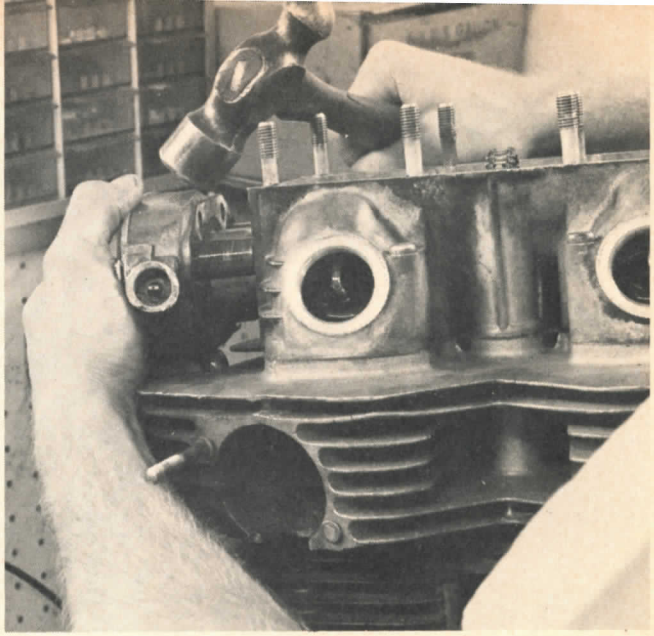
Remove the dyno cover, using the impact driver if necessary, so dyno retaining nut can be used to rotate crankshaft.



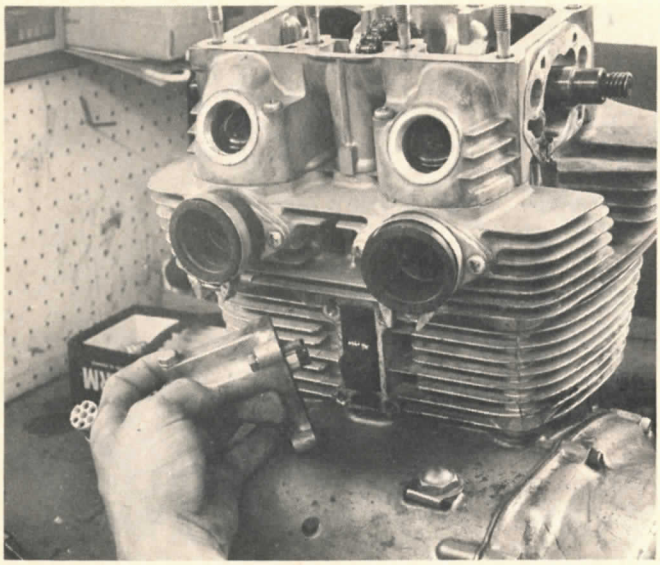
Remove the two camshaft gear retaining nuts, rotating the crankshaft (and the camshaft gear) to allow wrench to reach.



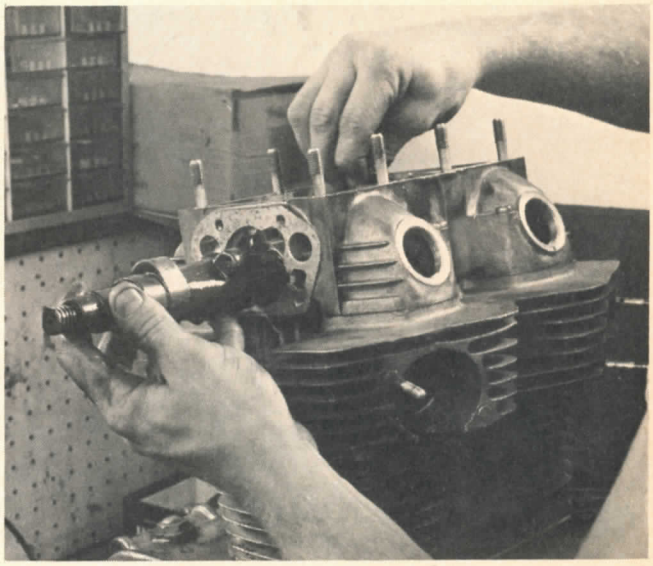
Remove the camshaft bearing box covers and lift off the contact breaker unit from the left side of the engine.



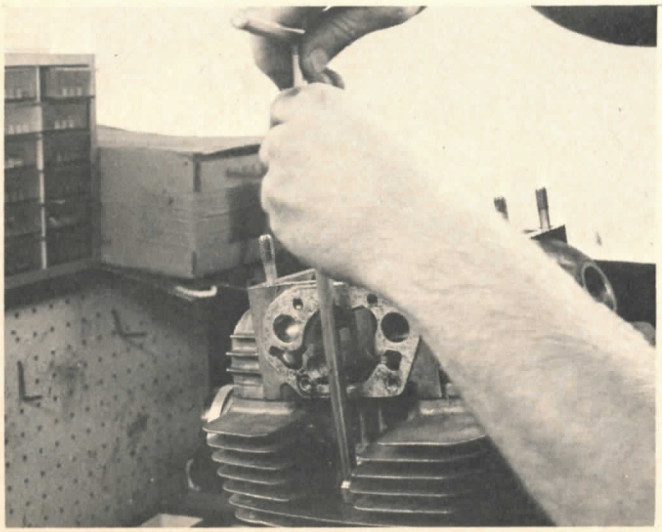
Rotate the crankshaft so that all valves are closed, then remove the bolts and tap the cam bearing boxes free.



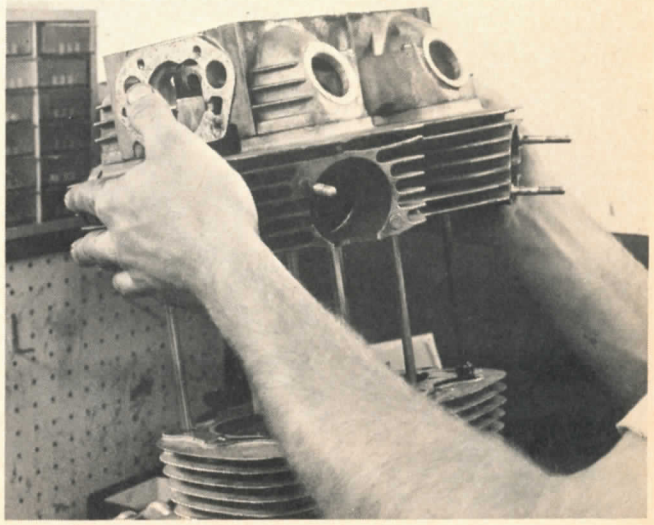
Remove the four 10mm bolts that hold the chain tensioner and lift out the tensioner assembly. Remove rockers.



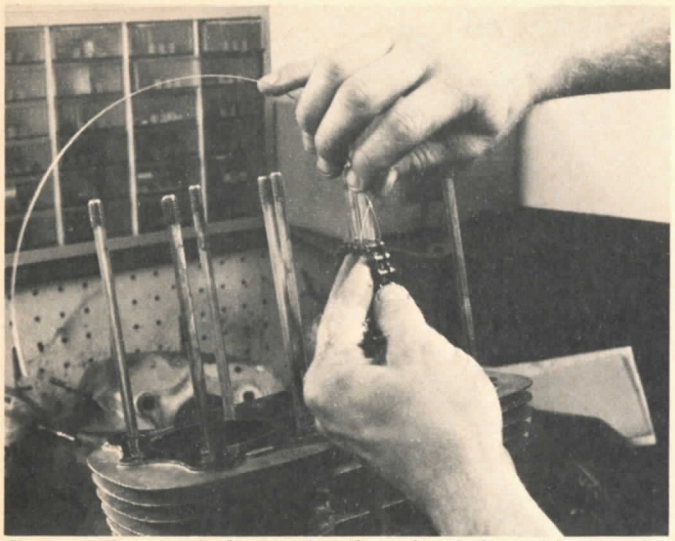
Wiggle the cam free from its sprocket, leaving sprocket and chain inside the cylinder barrel for now.



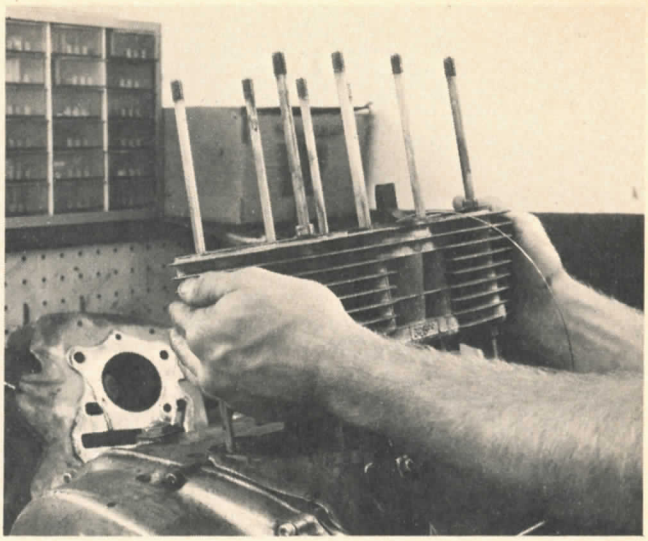
Loosen the two remaining cylinder head hold down bolts. Cam tower can be removed now if you're grinding valves.



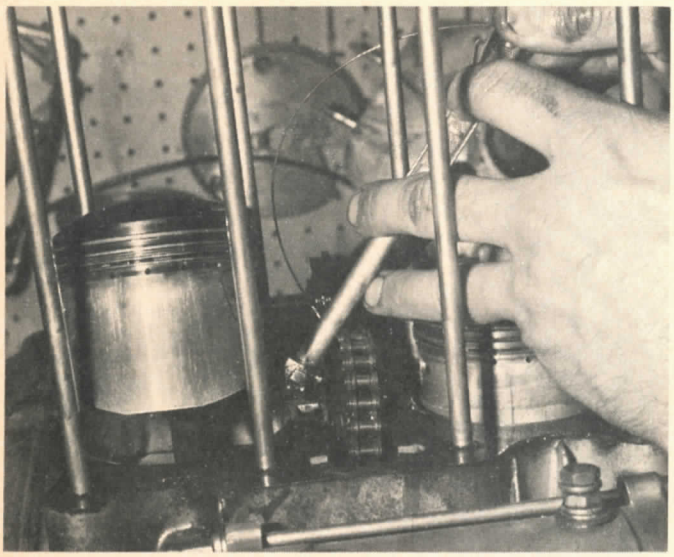
Carefully lift cylinder head free. A pair of smooth tire irons can be used to pry on both sides of head if needed, but a rubber hammer is better.



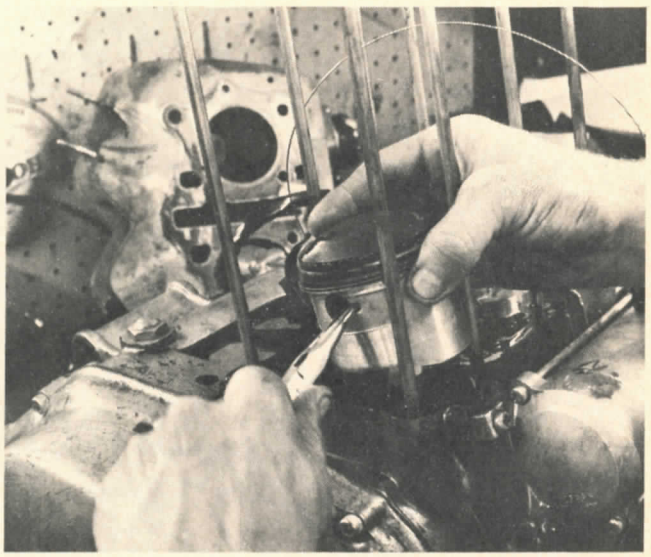
Remove the camshaft sprocket from its chain and loop and piece of wire around chain so you can retrieve it from case.



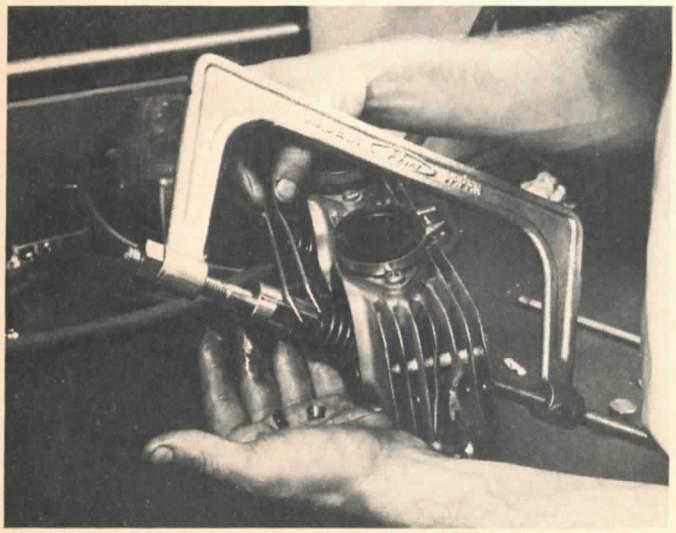
Pry the base of the cylinder barrel free from the crankcase and carefully lift the cylinder barrel free from its studs.



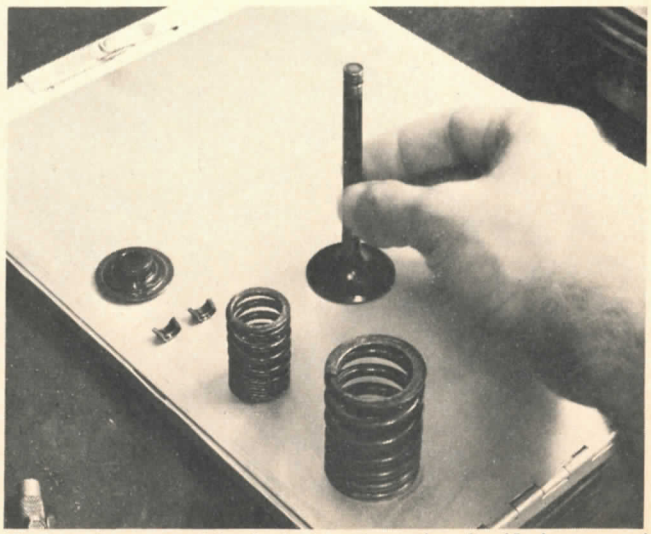
Remove the pair of half-round rubber sealing washers from beside the chain slot. A magnet can be used as shown.



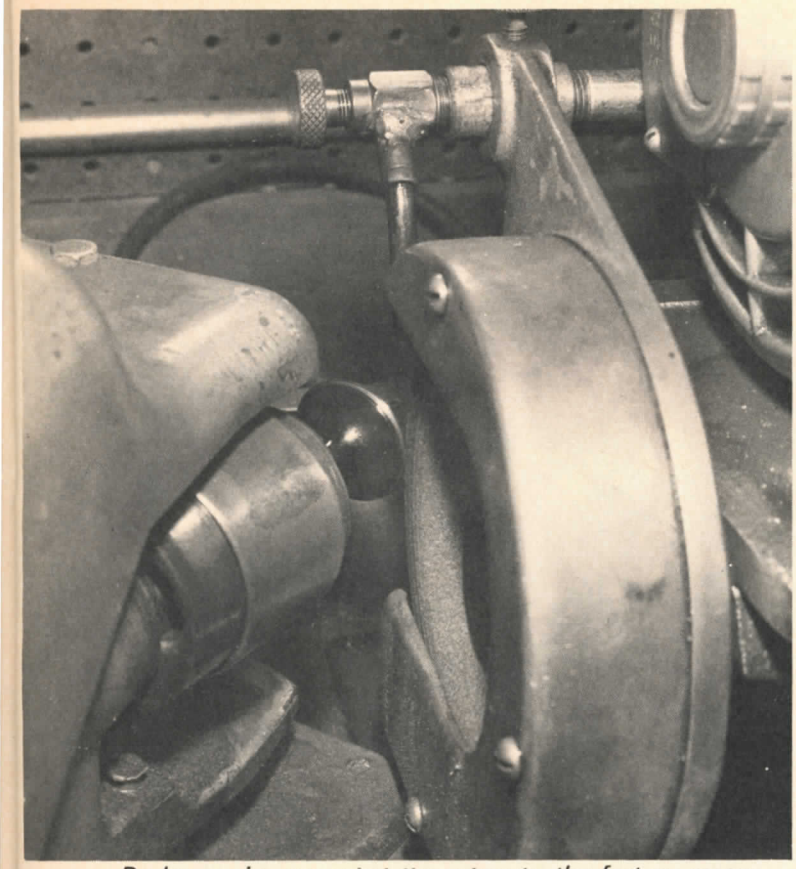
Squeeze the piston's wrist pin retaining clips and snap each free. Press wrist pins out and remove pistons.



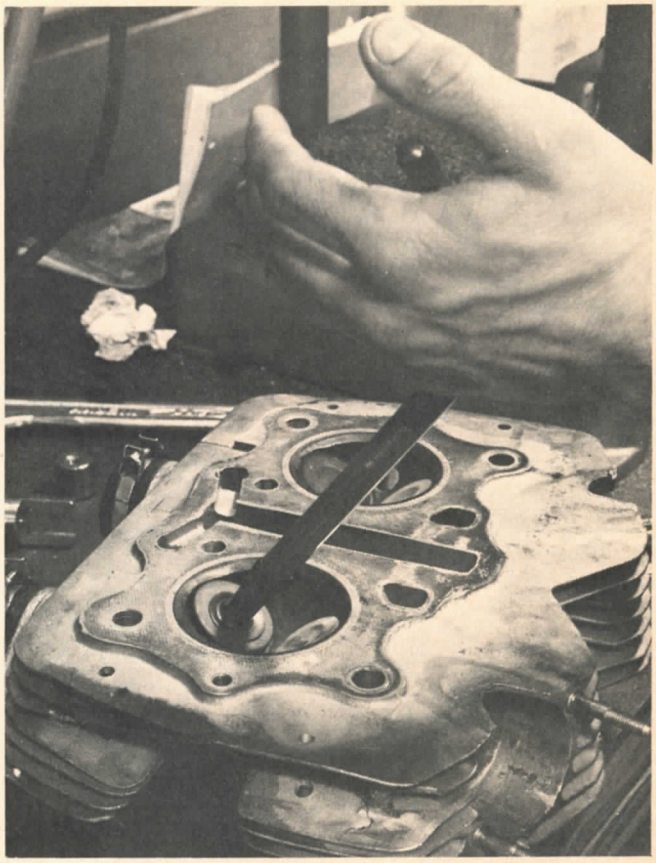
We'd recommend you take the complete cylinder head to a dealer to have the valves ground and seated. Dealer will compress valve springs and lift out split-circle valve retainers (in hand).



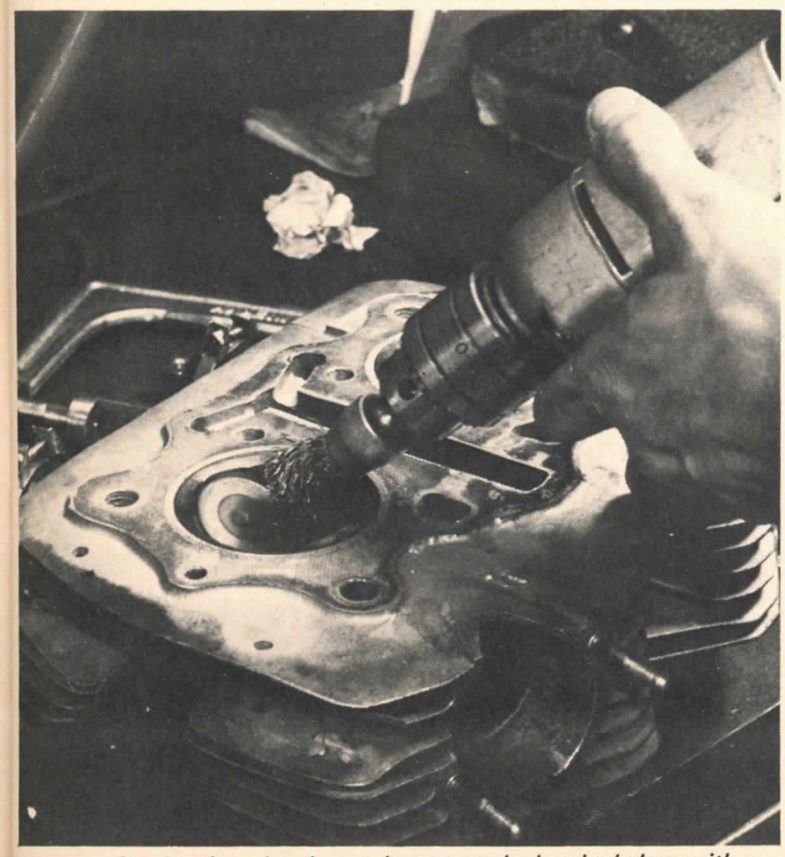
Each valve assembly includes the valve itself, inner and outer valve springs, valve retainer, and valve spring cap.



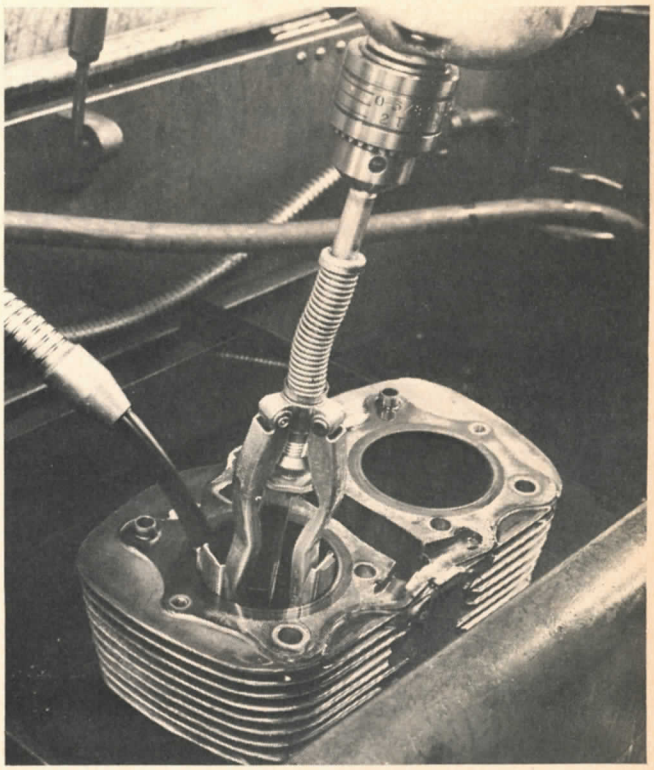
Dealer, again, can grind the valves to the factory recommended 45 degree seat angle and proper seat width.



Dealer will use a spare valve to handlap each valve seat. Valve head is held in suction cup handle while rotated.



Combustion chamber and ports can be brushed clean with a wire brush held in a hand drill — use a fine-bristle brush.



Check cylinders for wear, per shop manual, using a feeler gauge. If necessary, cylinders can be honed to remove any ridges or taper. With new piston rings, piston should have about .0015 clearance in cylinder. Reverse the disassembly procedure to complete engine, torquing ten head bolts to 14-16 ft./lbs., and tune per Honda shop manual.

Back where it all began in Sydney, Australia, 1937. American Jack Milne shows "Aussie" star Bill Longley the fast line. All photos courtesy Jack Milne and International Speedway (Costa Mesa, Calif.) manager Harry Oxley.

SUPER-SPRINTERS

THOSE SHORT TRACK SPEEDWAY STARS

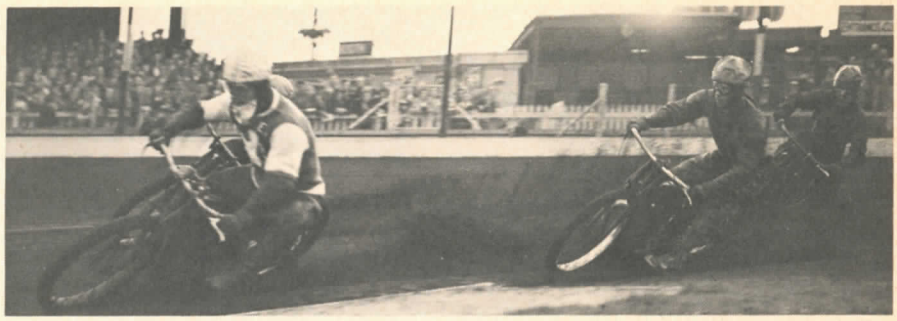
By Robert Schleicher

They say that things used to be different in the 'thirties – men were men, and both work and play were the domain where the strongest survived – no push-button automation, no TV, no great amount of leisure time. When men worked hard, they played just as hard, and, if motorcycle racing could be considered "play", it reflected the super-strength atmosphere of work hardened competitors and spectators. Technology has improved the machines men race on both road and dirt courses to the point where 1969 race-lap-times are but a fraction of what they were before the Big War – "they" also say the good-old-days will never return.

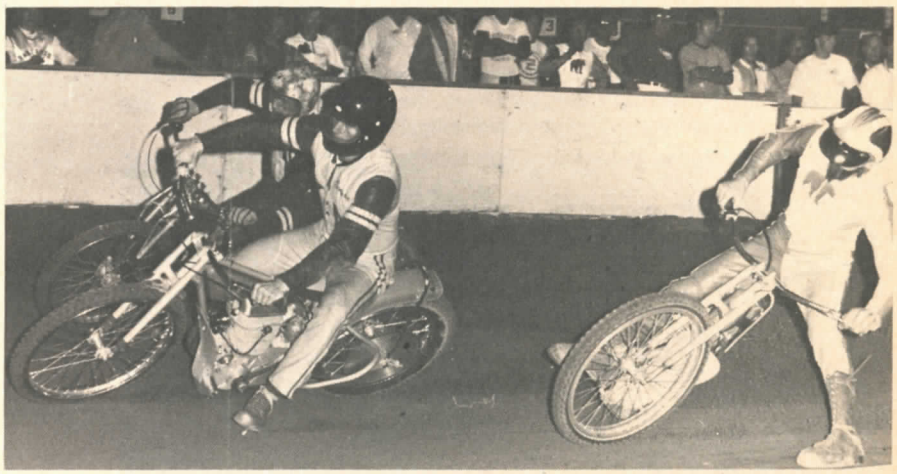
If you have the slightest curiosity about what motorcycle racing was like in the thirties, take a look at the photos on these pages – some depict action that occurred in 1937; others action that 'happened' only a few weeks ago – only the styles of safety helmets have changed (to save a few dozen lives in 1969), the machines and the riding styles are recreations of racing's past. The bicycle-like motorcycles sport 500cc displacement, alcohol burning, single cylinder engines with an easy 47 horsepower, and an all-up weight of about 160 pounds. That's less than four pounds per horsepower, enough to send a similarly powered dragster to 160mph, or a Bonneville streamliner over 200mph, yet these machines can average only about 60mph at the hands of the world's best riders. The cycles compete in Class A "Speedway" races, with their perhaps too brave riders wrestling that near 50 horsepower about a track less than a fifth of a mile around. You haven't any idea what a "handful" is until you try to bend that much power around one of those crushed rock corners. You're supposed to hit the straights (all 90 yards of it) with the machine in an upright posi-

tion; with all this power, its easier to "broadslide" the straights as well as the corners.

Many, many, current engine designs, of two-stroke and four-stroke types, with one or two cylinders have been used in these Class A 'cycles, yet the only consistently successful powerplants prove to be a 1932 designed single cylinder J.A. Prestwich and a 1950 era ESO "thumper." The English produced J.A. Prestwich (called J.A.P. for short) engine has been slightly modernized over the last 35 years, but it still retains a bore longer than its stroke and an iron cylinder and head. The more up to date ESO is produced in Czechoslovakia by the Jawa firm. This engine is a bit lower built than the JAP, with alloy cylinder and head, but a most unusually long stroke, as compared to its cylinder's bore, keeps it in the category of obsolete by modern standards. These honking big one cylinder engines, and their 1930 vintage frames, are kept alive by the conditions under which they compete. The rider must literally be able to feel the engine's torque if he hopes to keep the front wheel anywhere near the ground and the back end at the back end. Races are won more by the relative ability of the bike-and-rider to accelerate out of the corners (and delay entry into the corners) than by any great degree of actual cornering speed. A Class A Speedway event is far more like a series of eight 100 yard dashes down a "straight" with curves at its beginning and end. The corners are used to scrub off the 70mph speeds accumulated on the straights and to give enough room to line the bike up for the next 100 yard sprint.

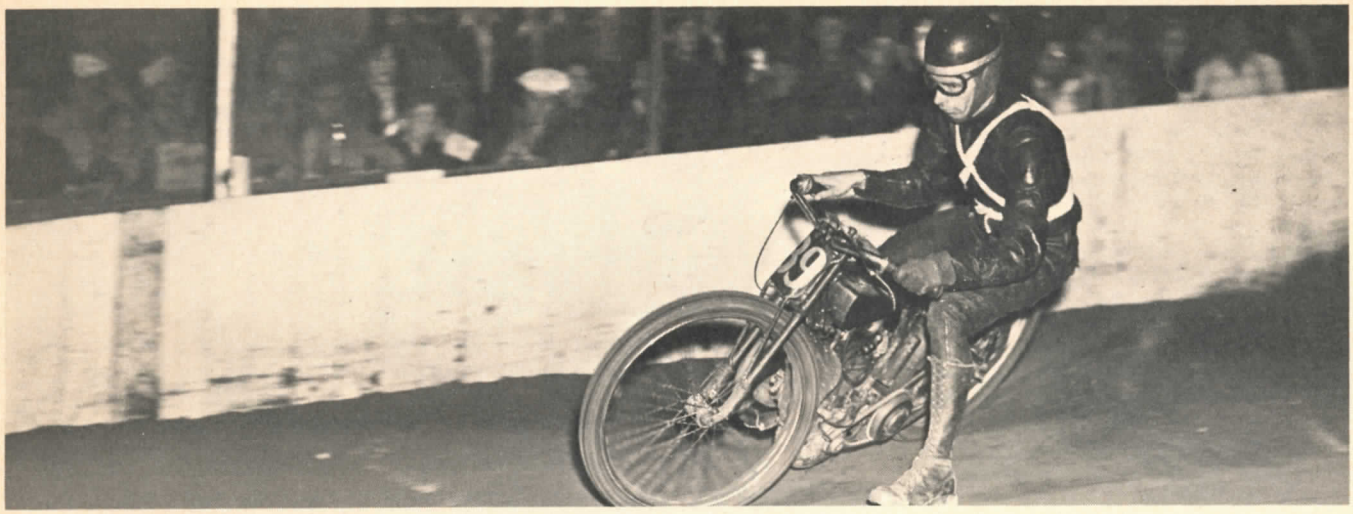


Jack Milne (center) on the path toward America's first World's Speedway Championship, Newcross Stadium, London, England, 1937. Lead rider is 1936 Champion Lionel VanPraag of Austria with his teammate Clem Mitchell on the right.

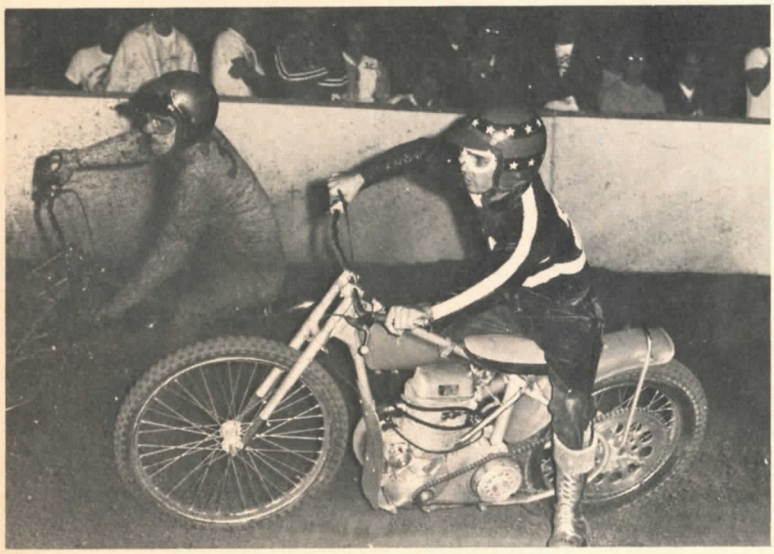


Dan Gurney's driving protege, Swede Savage (left), and Speedway ace Larry Heinsleman tuck inside John Fishburn at one of the International Speedway's Friday night events in Southern California.

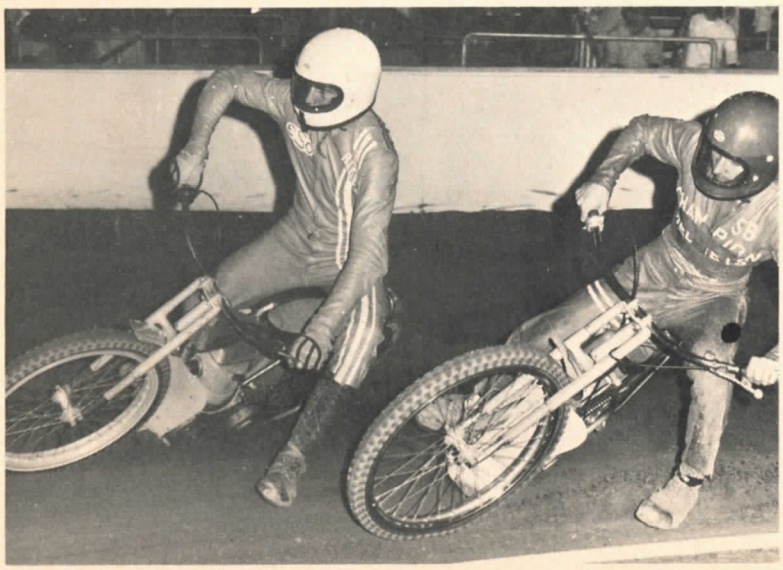
Nearly two decades after his retirement as a Speedway star, Jack Milne is once again envolved in the sport, now promoting fifth mile Class A events at International Speedway in Costa Mesa



Jack Milne at Lincoln Park about 1948. The Milnes showed the rest of the world how to ride the Speedway corners while standing on the pegs for better body-english and leverage, hence quicker cornering.



Majority of the machines today are powered by Jawa built ESO long stroke 500cc single cylinder engines like Jim Nicholson's.

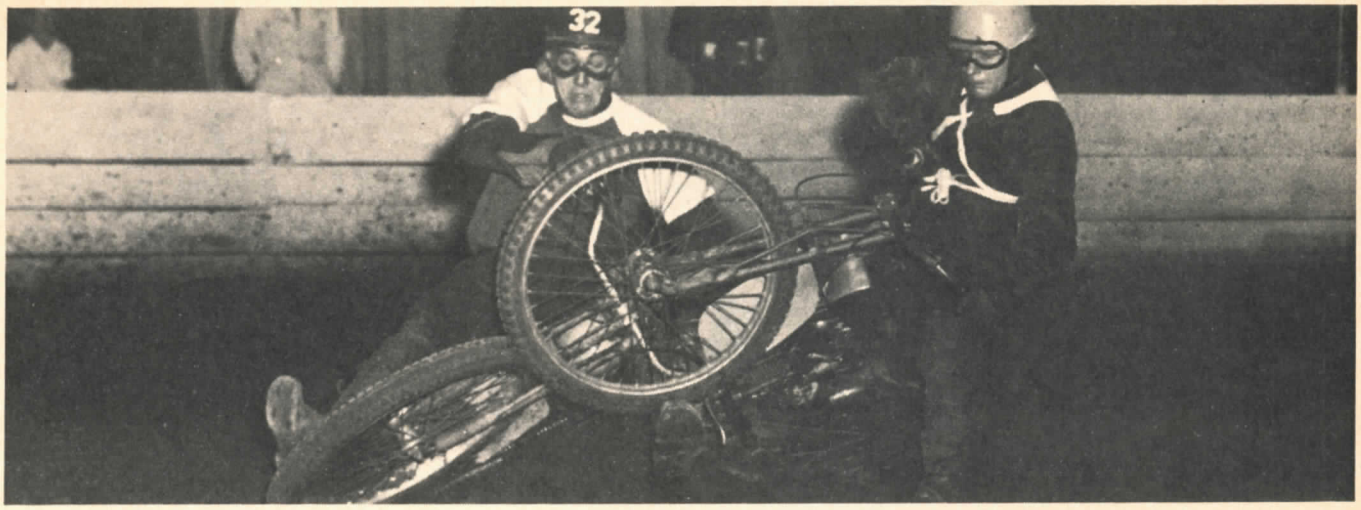


Rick Woods (left), current U.S. Speedway Champion, and Steve Bast, prime contender for his title, show their styles.

The action appears to occur in the corners, as the machines throw up wild rooster tails of finely crushed rock while they're held over at about 45 degrees, all with the rear wheel at nearly a right angle to the actual line of the corner. The better riders however, pass as they find more traction exiting the corner or because they can manage to keep the bike upright and tail-in further (and faster) into the corner.

Tires, for use on the crushed rock surfaced fifth-mile short tracks are usually of the mild Dunlop "Trials Universal" block pattern at the rear, with a knobbier front tread. With such a loose surface, and so much power in the twistgrip, a Speedway event is a constant search for traction. The thumping torque of a long stroke single cylinder engine is impossible to equal with more modern designs. A rider must use every ounce of energy he can muster to keep the bike pointed straight, and to keep it upright through the corners. To gain the necessary leverage of man and body english against machine, the riders stand up in the corners with one foot on the footpeg and one on the track. A less than forty second sprint of four laps is about all a rider can endure. Few of the Speedway events exceed this four lap maximum and you better believe that the races are close. Most of the races in this country are set up so each rider of proven ability (through a series of high placings in beginner and amateur class races) have a chance to compete against every other rider in a series of heat races. As the night's race series progresses, race winners compete against race winners so that the "best" four riders of the night compete in the "A" main event, the second best four in a "B" main event, and the third best four in a "C" main event.

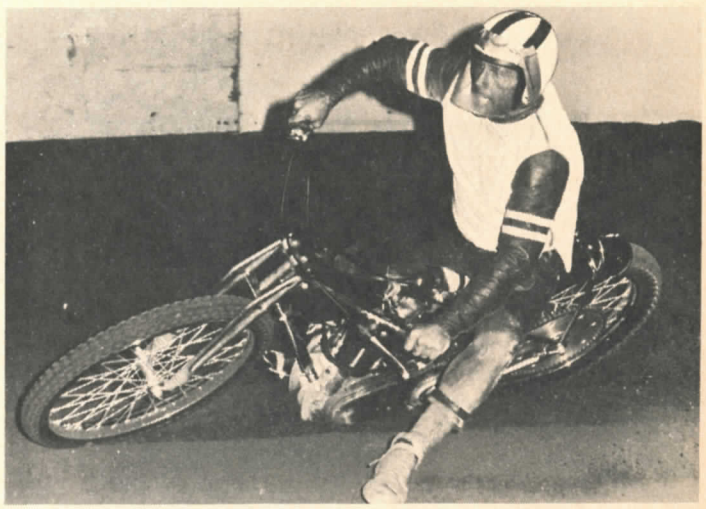
Speedway racing got its start on grass-surfaced tracks in Australia about 1927. The thrills of the new sport spread to England in the 1930's, and to the West Coast of America in 1931. By 1934, the short track sprints had won the interest of the California crowds who supported the Speedway stars with attendance figures in the



Post war action at Lincoln Park Speedway, Los Angeles, California, 1948. 1934-45 American Speedway Champion Cordy Milne is about to take a typical Speedway spill as he climbs over Pete Feuerhelm's wheel.

tens of thousands. Brothers Jack and Cordy Milne completely dominated these U.S. events by the mid '30's, with Cordy the U.S. Champion in 1934 and 1935. In late 1935, the brothers Milne carried their enthusiasm back to the home of the Speedway, Australia, with enough success during the 1935 and 1936 seasons to become the top stars of the day. Separate English Speedway teams hired Jack and Cordy for English Speedway races in 1937. Jack won the 1937 World Championship, with Cordy second, and fellow Yank Wilbur "Lam my"Lamaoreaux third – Americans have never placed so high in world motorcycle competition before or since! The Second World War ended all forms of motorsports competition, but Speedway racing revived again in 1945. Crowds of 90,000 attended the races in England, and still do, however, the U.S. revival ended in 1950 with a lack of paying spectators.

Dude Criswell, a Southern Californian who remembered how it used to be, started a fresh series of fifth mile short track Speedway events in the San Fernando Valley during the summer of 1968. The 1969 summer season saw the ex-speedway champ Jack Milne establish his own series of Speedway events near Costa Mesa, California. Thousands of Southern Californians attended Criswell's Saturday night races at Whiteman Stadium and Milne's Friday evening races at the Orange County Fairgrounds. Reasonably successful short track races were even held in such diverse locations as Tijuana, Mexico and the Los Angeles Sports Arena (indoor racing). After 17 years of silence, the alky-burning thumpers are once again surging around the tight ovals in Southern California. Speedway racing never made it out of this area of the U.S. in the thirties or forties, but both Milne and Criswell predict other races in the east and the midwest during the seventies. If it's true, the rest of the country is in for a chance to roll back the racing clock a few decades to see racing like it was in the strongarm days.

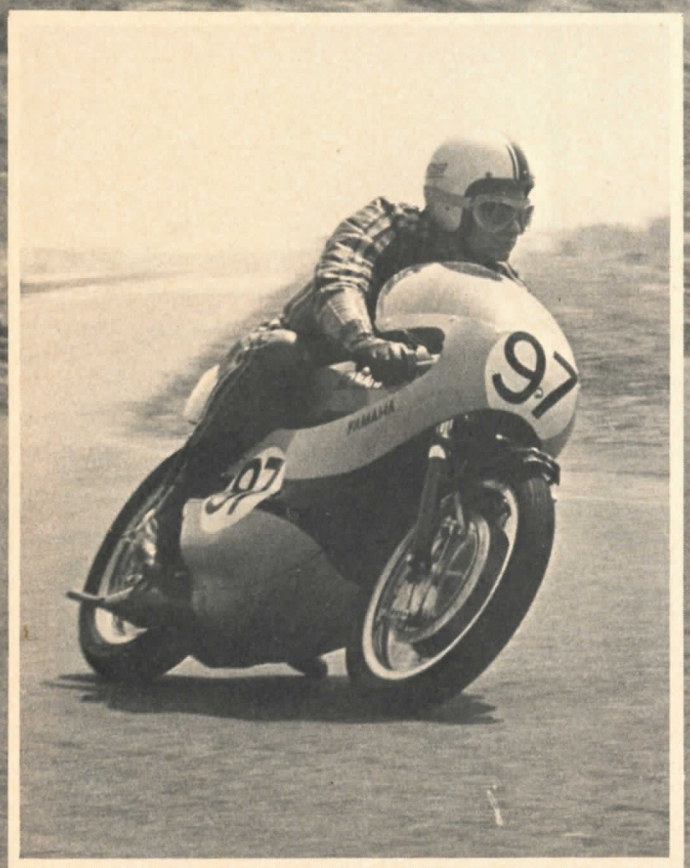


AMA Class C flat tracker and sprint car driver Don Hawley horses his J.A.P. engined machine through a corner.

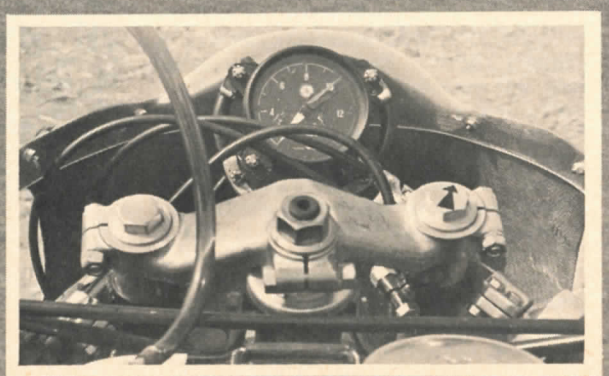
Swede Savage scrubs off a bit of speed in true short tracker style just prior to straightening out for the straight.

THE "FUJI" FLYERS

YAMAHA'S SUPER RACERS



The 350, shown here, tended to jump around under hard braking. It did the same when cornered hard.



The rider's eye view of the Yamaha road racers. The arrow on the fork crown shows which way to turn the brake adjuster.

There comes a time in every motorcycle magazine editor's life when he gets a real thrill. It might be testing a new model, or a trip to Europe or Japan to visit various factories, or maybe testing an existing model racing bike. In our case it's the latter in that we had the chance to swing our legs over the fastest production road racers in the world. These machines? Yamaha's 250cc and 350cc superracers.

Designated the TR-2 for the 350 and the TD-2 for the 250, both machines will top 140 mph, with the 350 running over 150 with the proper gearing. Needless to say, these two motorcycles are unreal to ride.

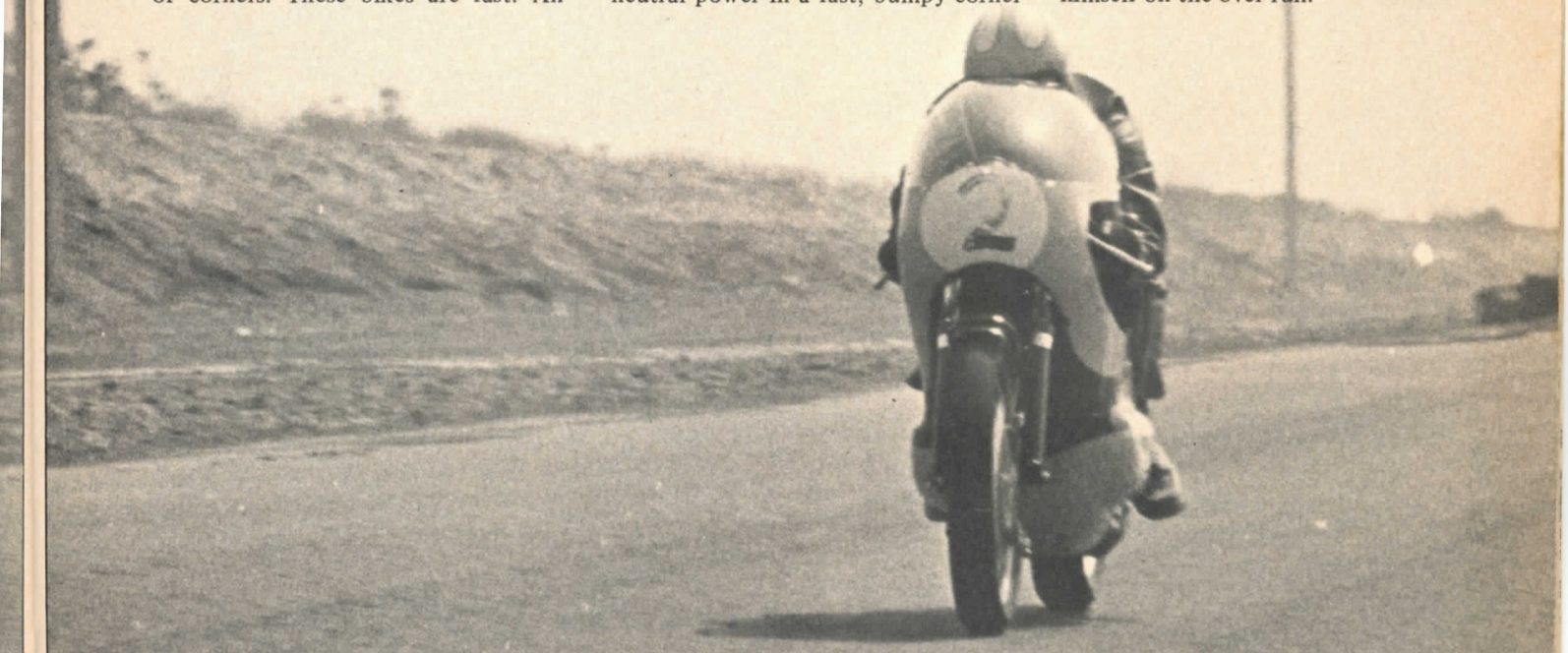
Like all road racers, these machines take some getting accustomed to. Our Editorial Director, George Elliott, was along for his first ride on a machine of this type. Editor Dave Hetzler spent some seven years road racing, three of which were for Yamaha, so the bikes weren't too strange to him.

The first impression one gets of the screamers is their speed, both in their top end and the way they get off of corners. These bikes are fast. An example would be that the 250 will pull ANY production street bike built, bar none. And the 350 is faster yet.

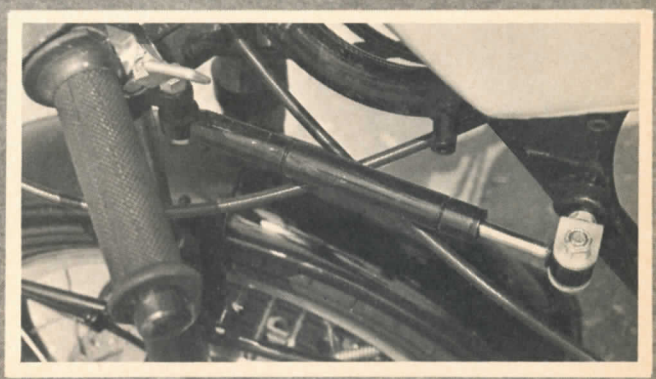
The second thing noticed about any road racing machine is the brakes and on the Yamaha's these are easily noticed. These brakes work better than any our Editor had experienced in the past. At 135 mph it's possible to lock up the front wheel, if that's your thing. It's not ours so we suggest that if you ever get to ride either of these bikes you go easy and use only two fingers on the lever.

Next on the list of things to look for in a road racing machine is the handling. The TD-2 really handles well. It's flex-free in the corners and shows no tendency to either pogo or jump about. The 350 is something else again because it likes to do some strange things. Under hard braking the rear end snaked about like the rear wheel was locked up, which it wasn't. It did the same under acceleration off a corner, however, part of this could be the fact that the tires are hard pressed to transmit the awesome power to the ground. Riding on trailing or neutral power in a fast, bumpy corner is also a thrill, if your thrills come when you scare yourself. After the testing period was over we found the 350 had worn-out shocks at the rear. If this was the only handling problem we wouldn't have mentioned it, however, in talking to the head of Yamaha's racing department he agreed this could be part of the problem but even with new shocks the bikes left something to be desired. Honesty like this is hard to come by when racing bikes are being discussed and we appreciate it.

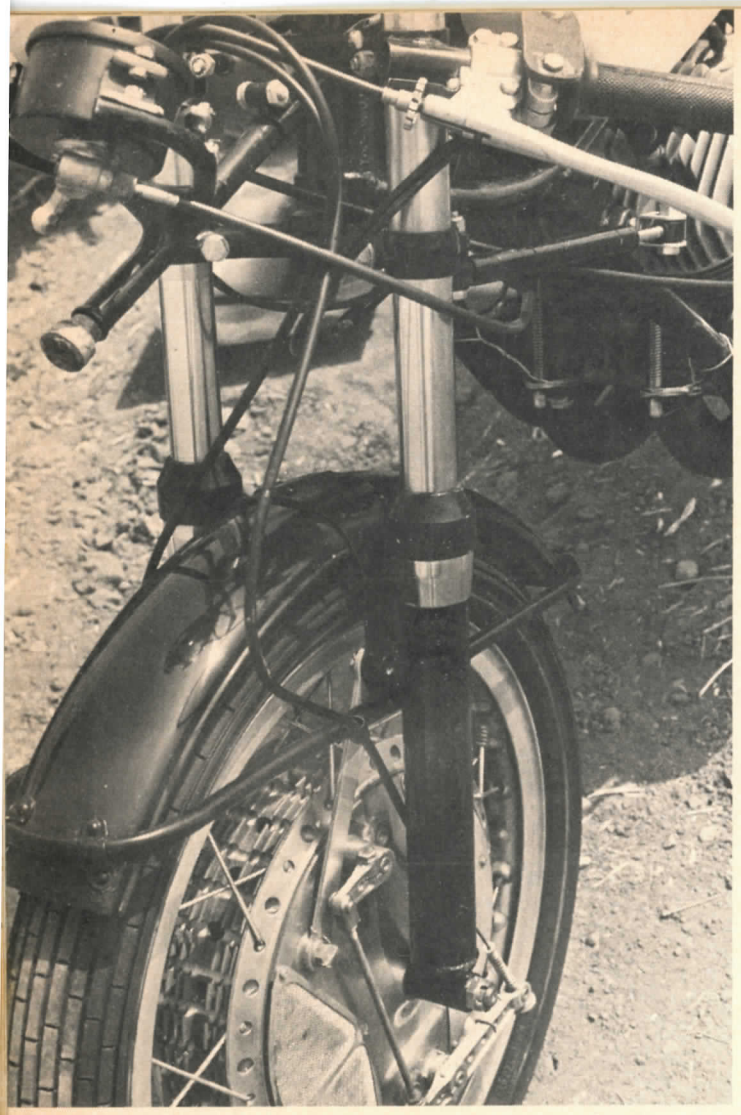
Looking at the two bikes is like looking into a mirror. They're both the same from outward appearances with the exception of the engines. And even these look the same to the uninitiated. Both bikes have those fantastic four leading shoe front brakes that originally were found on the European 250's that Yamaha raced two and three years ago. The rear brake consists of single leading shoe unit that is exceptionally smooth in operation, so much so there is no hesitation in the rider's mind if and when he decides to use it to steady himself on the over-run.



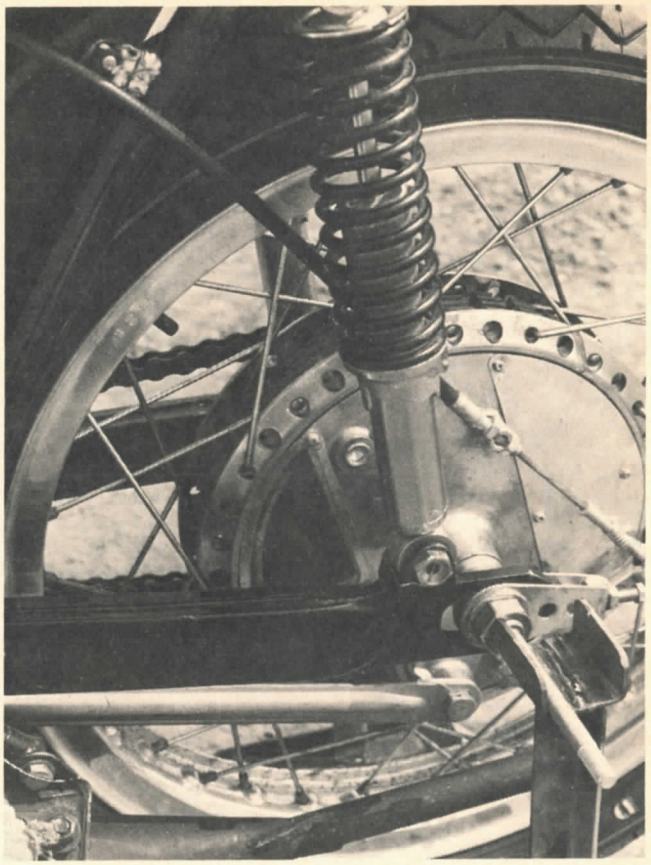
Both bikes carry a 14 grand tack but the 350 is red lined at 9,800, the 250 at 10,000 rpm.



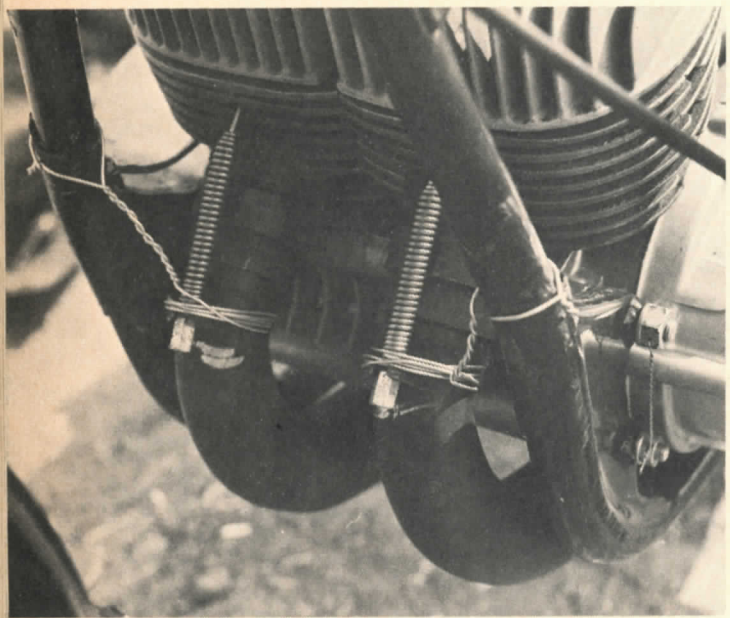
The only dampener used on the road racers is a hydraulic shock. It's all that's needed because both bikes show no tendency to do anything but go straight.



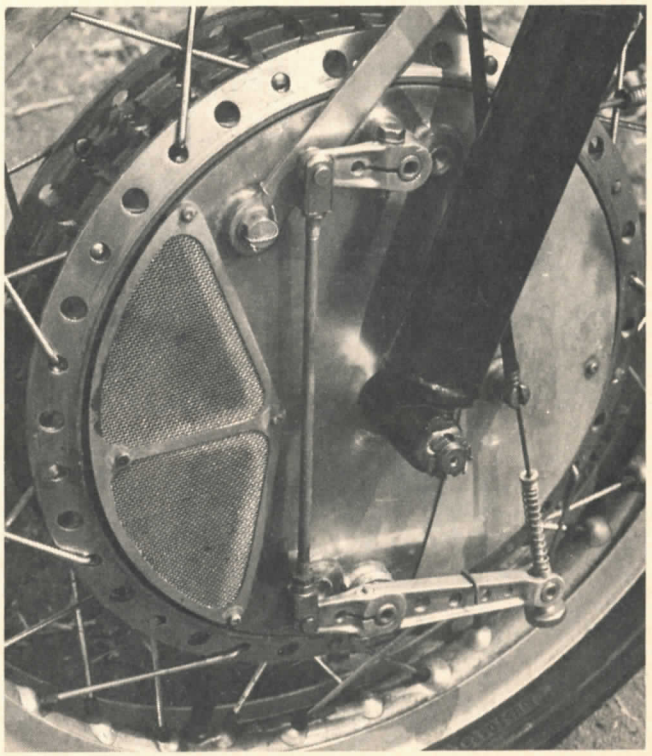
Front forks on both machines were stock Yamaha. Note the double brake cables made necessary by the four leading shoe brake.



The rear shocks used are either stock Yamaha or Girling. The swinging arm is boxed for strength.



Both exhaust pipes are held on by a spring arrangement that is safety wired to guarantee they won't come loose.



Here is the front brake that takes some getting used to. The large air vent is necessary to keep the whole unit cool when it receives hard use.

The engines, of course, are entirely different. The bore and stroke of the TD-2 is 2.20 inches by 1.96 inches, totaling 246cc. The 350 is 2.40 inches by 2.34 inches. Yamaha says the 250 produces 44 horsepower 10,000 rpm, The 350, 54 at 9,500. As far as we're concerned both these figures are true. It would take this kind of power to propel these machines at the speed they're capable of.

The engines are lubricated by the oil injection similar to that found on the street bikes. A separate oil tank is carried in the rear hump of the seat and via oil lines the oil is directed to the engine on demand, by a means of a positive displacement pump. Surprisingly enough, Yamaha's method of oil injection is very basic but it works well so they see no reason for a change.

One thing that has been changed, at least with the 250, is the carburetors. When the TD-1, the forerunner to the TD-2, was first introduced it had remote bowl carbs. We noticed that now both bikes run Mikunis that are very similar, at least on the outside, to those found on the street machines.

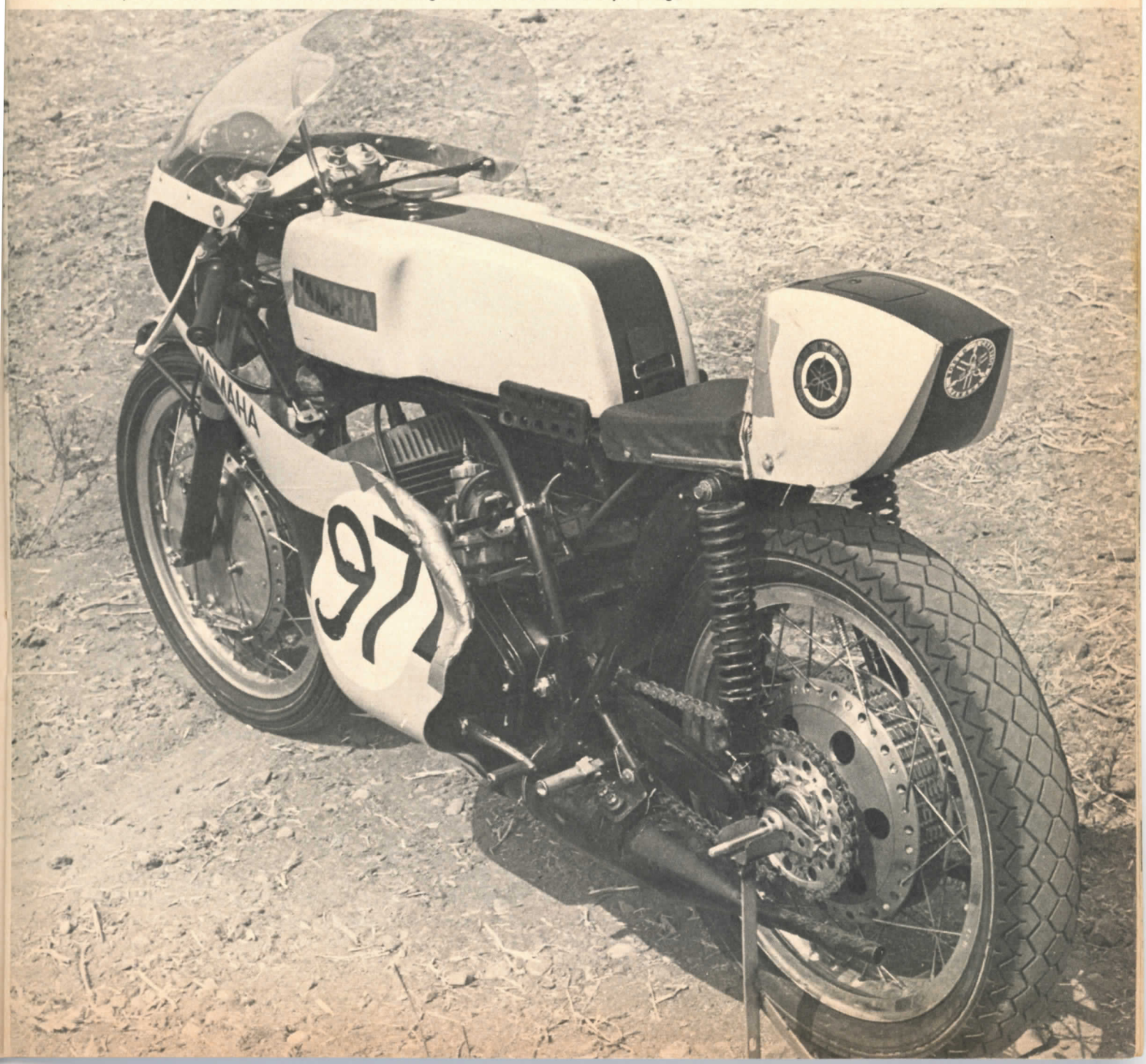
Other than the carbs the engines are basically the same as the street bikes' powerplants. The crank runs in ball bearings, the rods in caged needles at both ends. The clutches are mounted on the mainshaft of the transmission, which is also a change from the earlier racers where it mounted on the end of the crank.

Ignition is by flywheel magneto, and of course being a Japanese bike, the various heat range of plugs are NGK.

In the frame department there is a paradox. The 250 handles well, the 350, not so well. It was explained to us that the '69 frames look exactly the same as the '68 units, but in the case of the 350 the newer units don't handle as well as last years. We can agree with this as Dave Hetzler rode one of last year's machines and he said there is a world of difference between the two.

On the 250 we rode, the suspension

In full racing trim the Yamahas show the heritage of the European machines which dominated racing there two and three years ago.



was Yamaha all the way around. Much to our surprise the bike handled well. In most cases the first thing to do to a Japanese machine, particularly a road racing bike, is to throw the rear shocks as far as you can. If the bikes continue to come with shocks as good as those on the 250 this chucking situation will change in a hurry.

The 350 had Girling shocks on the rear but as stated earlier they were worn out so we'll pass judgement on them at a later date.

The front forks work much better than those Dave remembered on the bikes he used to ride. Because of this the internals must have been redesigned, much to the advantage of the rider who is trying to cut a fast lap without going on his head.

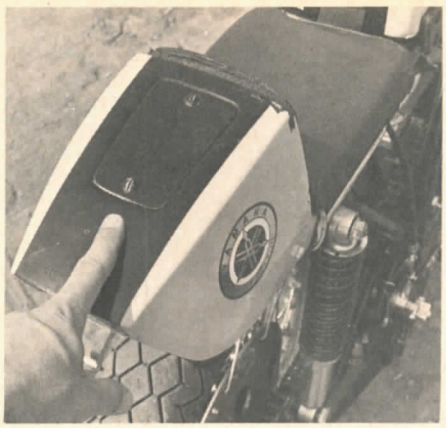
One of the things we didn't like about the bikes, and this really isn't a complaint, it's more of a statement, is that a tall rider finds it hard to become confortable. George Elliott is about 5' 10" so he had no problem but Dave is over six feet and when he got wrapped around the machine it was kind of comical. That is until you realize that in a cramped position a rider tends to get tired, and when he gets tired is when he starts to make those small mental errors that can be so painful, both to the mind and the body. We have to admit that most road racers are short, but there are those who sit fairly tall in the saddle and they'd be much more happy if there was more of a saddle to sit tall in.

Other than this one thing we found it hard to fault the screamers, especially the 250. Perhaps some of you don't realize it but Yamaha has not been beaten in A.M.A. 250 road racing during the last five years. No brand of bike has amassed this record in racing before, we mention it only to show the technical lead Yamaha has in two-stroke racing development.

The 350 hasn't faired so well. This last year the 350's were admitedly the fastest bikes on the National circuit but they've been plagued with small problems that have kept them from the winner's circle. Their main fault lays in the fact that they keep breaking rings, probably due to the large ports in the cylinders. In the future they expect to change the material the rings are made from and hopefully this will cure the problem. Hopefully, we say from Yamaha's standpoint, everybody else is pleased with the situation just the way it stands. You can understand this when you realize that Yamaha is the only bike to qualify at Daytona at over 150 mph.

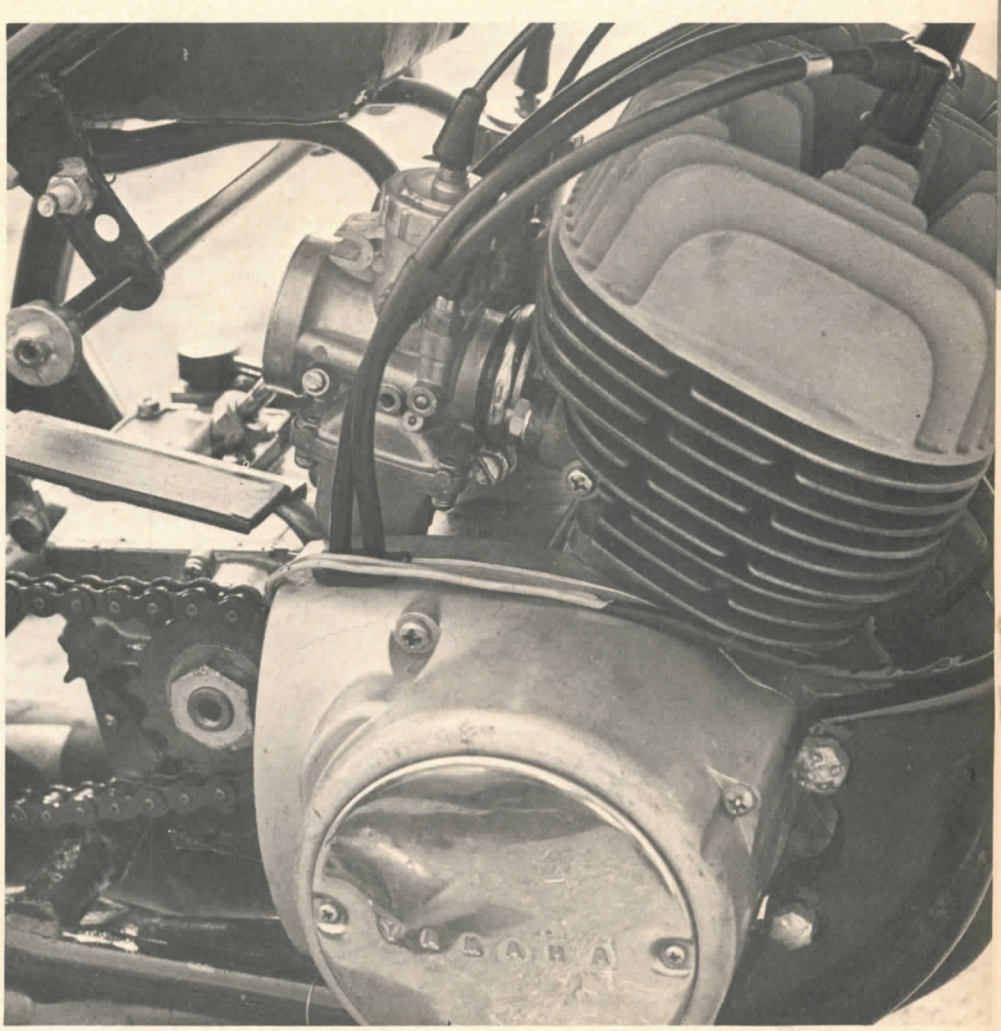
With the exception of Daytona next year, Yamaha is thinking about cutting down on their road racing expenditure. We, for one, would hate to see it. There's something very thrilling about four or five of those yellow flyers charging around at the head of a 70 bike pack.

If they do leave the road racing circuit, racing, and the fans of racing, will be saddened. The all-conquering Yamaha team is something else.



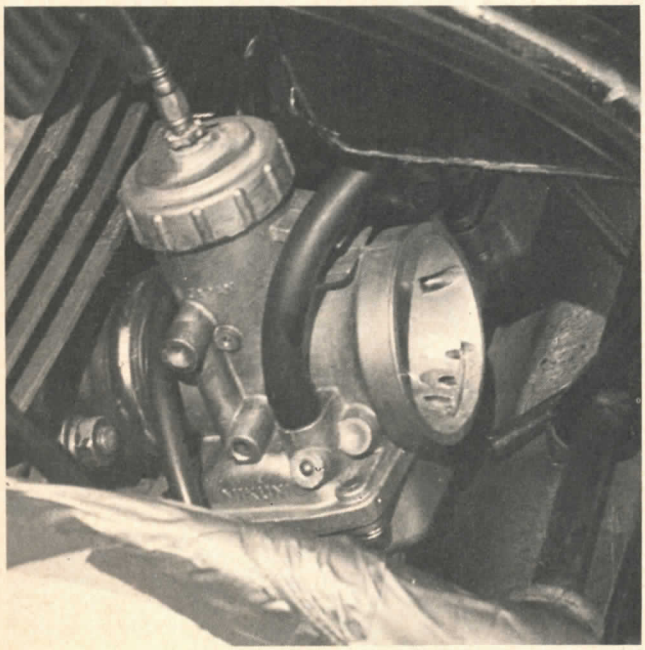
Under the hump of the seat is where It holds almost two quarts. the oil tank is carried.

Editorial Director George Elliott asks some questions of Dave Hetzler before taking his first ride on a 140 mph motorcycle.

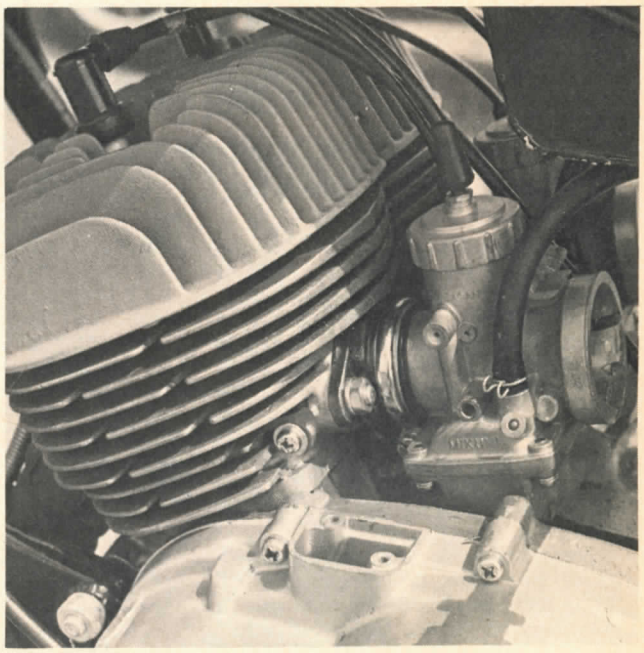


Spark is provided by a rotating magnet magneto that resides under the right hand crankcase cover.

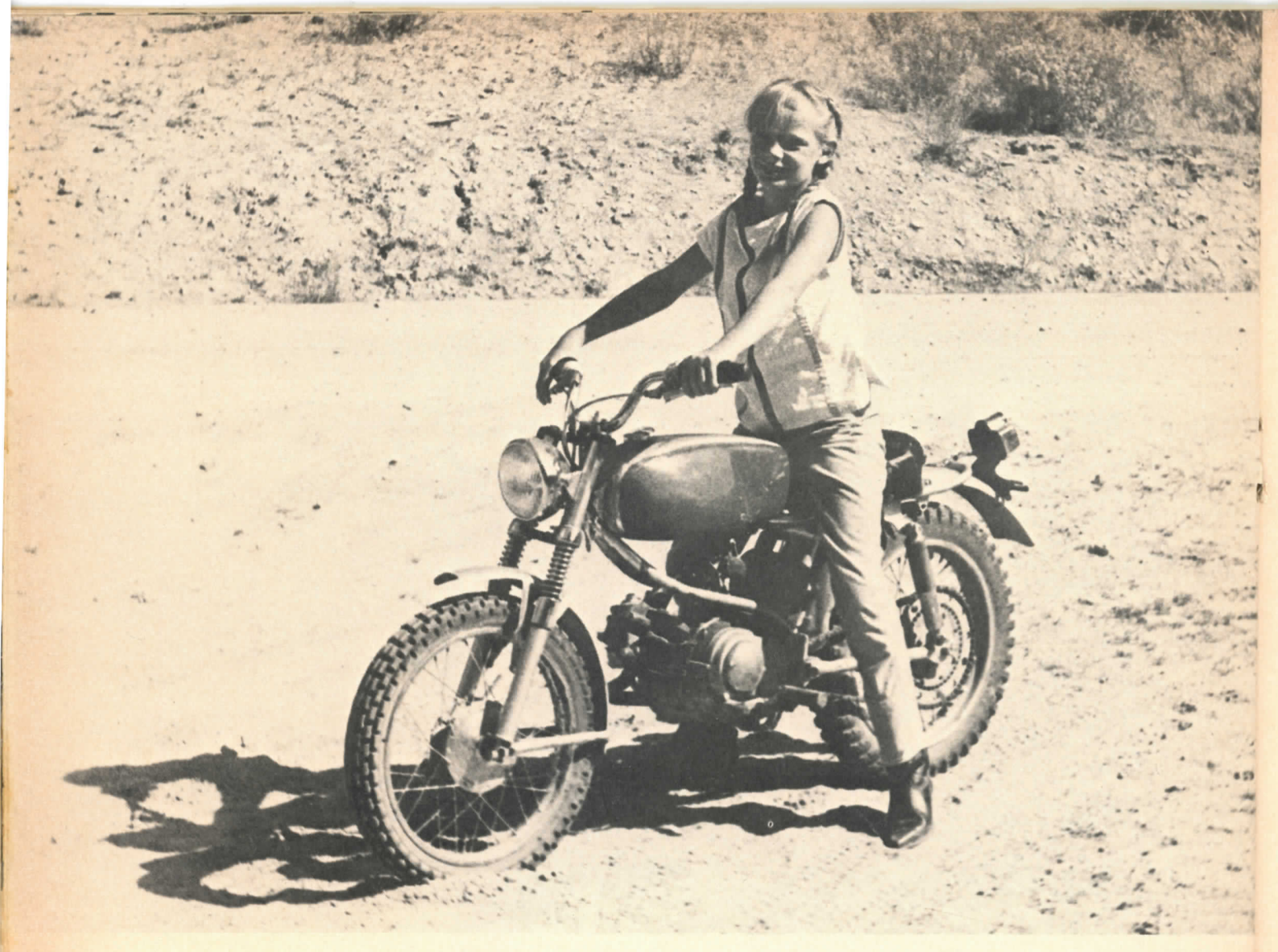
The 250 was completely opposite from its larger brother in that it handled very well.



The carburetors look more like a street carb than racing units.



The hump over the carbs is the bottom of the over six gallon gas tank. The only visible difference between the two engines is the rounded cylinder and head fins of the 250.



A MINI-BIKE FOR T

THE REAL DO-IT-YOURSELFER CAN SPEND A LITTLE TIME AND MONEY AND MAKE THE PERFECT BIKE FOR HIS CHILDREN

Too little for big bikes and too big for mini's? A lot of kids fall right in that spot. The mini bikes are sweeping the country with their popularity, no doubt about it, they are a ball and provide hours of enjoyment for kids of all ages. They are a good tool with which to teach a youngster to ride, as they have that most important factor of being low enough to the ground to let the smaller person straddle them either while starting or while being detained in a rough spot.

For a while the mini-bike is just the ticket, but after the new rider has gained more proficiency, he or she will soon want to get out and do some for real cycle riding and the mini is seldom up to it. For one thing, most of the minis have little or no valid suspension. This factor coupled with the ultra-short wheel base soon causes the mini rider to get bucked and pitched around in places where a little bigger and better suspended machine would walk on through. Another problem with the short wheel base is that by the time the mini-bike is geared low enough to have a real steep-hill pulling power, the front wheel decides it doesn't need the ground any more, and the rider has trouble using the power without incurring a bad case of the loops.

A machine that fits right in the middle between the mini-bike and the actual cycle is hard to find. The cycle that is marketed for over the counter sales is built for the average rider and the shopper who goes looking for a shorter machine will come back surprised to have found the 50cc through the 750cc machines are all close to the same height from the ground. With the exception of the Indian Boy racer, produced by Floyd Clymer, you won't find much for the person in between.

One of our contributing editors, John Larsen, was faced with a problem like this in trying to find a medium-sized machine for his daughter Laura. With an eye on keeping cost to a minimum as well as aiming for simplicity, he decided to use used parts of older machines. Follow along and you may get some ideas that you can put to good use on a project of your own.

The whole mini-bike project is based around the frame of a retired 50cc Ducati Falcon. Here John counseled, "Don't become discouraged if your preliminary scouting of the bike shop back rooms or neighbor's garages does not turn up a Ducati priced for quick sale. Just look for a tube frame machine as the smaller of these are

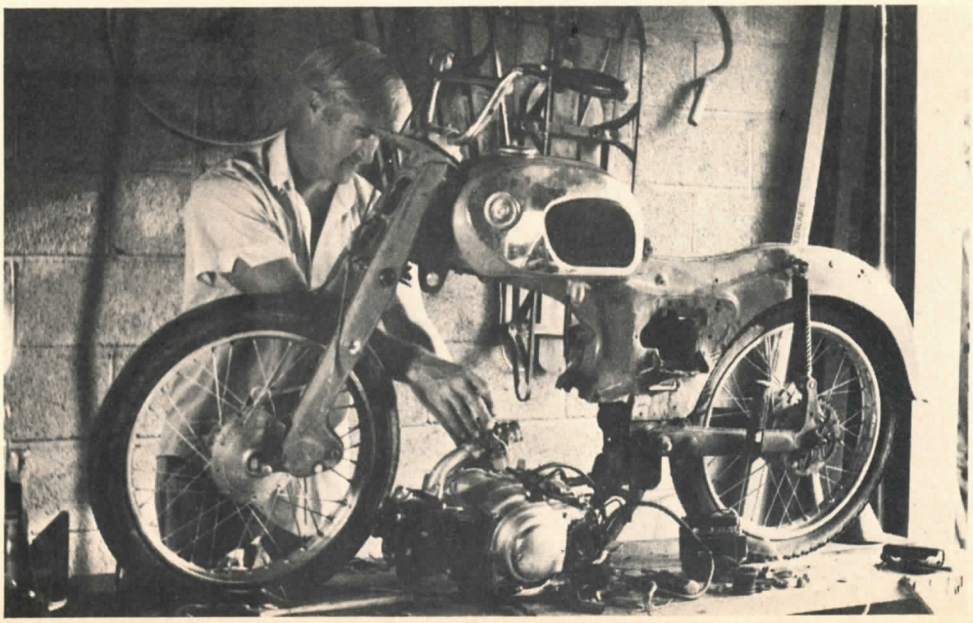
much more easily modified than the pressed backbone style frames."

Once you have found a suitable specimen for your project, you may restore it to useable condition, making any necessary modifications, or you can take the approach that John did and give the machine a complete face lifting. The principle reason he made as many changes as he did is that the Ducati was minus an engine and front wheel when purchased. The cost of a new wheel assembly complete for most any machine is prohibitive and since there was no used units available, he located a friend who had the front forks and wheel from a Yamaha Trail-master and after a go with the welder, everything fit. Not only was some cost avoided, but the Yamaha units had better damping action than the old worn Ducati forks. Also correct was the front rim size of 16 inches. This matched the 16 inch rear wheel and helps keep the overall height of the machine close to the ground. If a person had the utmost in handling in mind, he would go to larger rims both front and rear, but the whole project was to keep the seat height at a minimum of 26½ inches.

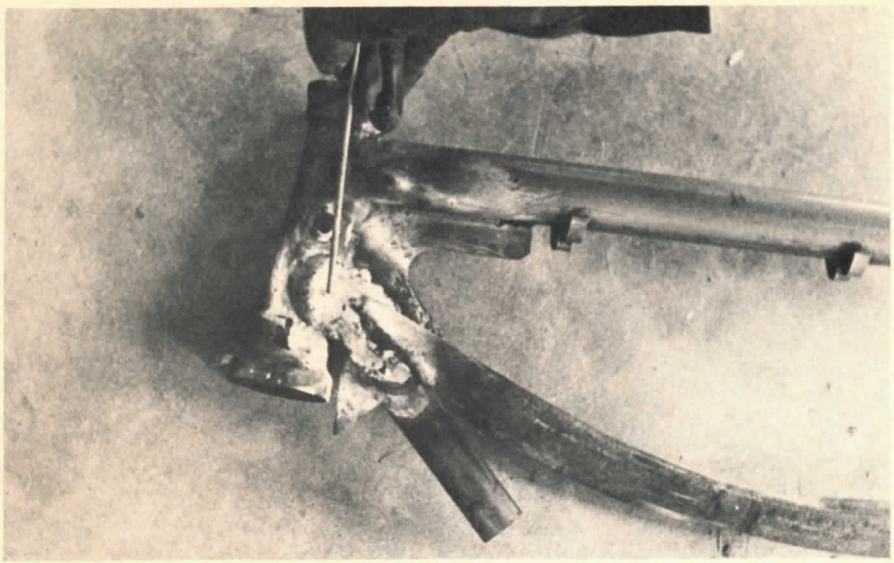
The way the forks were modified to fit the Ducati frame was to first remove the races from the Yamaha steering head to protect them from heat damage, and then the portion of the frame which holds the races was torched from the old Yamaha frame. The Yamaha race holder parts were larger than the Ducati, therefore, the Ducati items were cut off and the Yamaha parts slipped over stubs left on the frame. Then they were spaced the correct distance apart to take the

Most trail bikes are too large for the smaller segment of our riders.

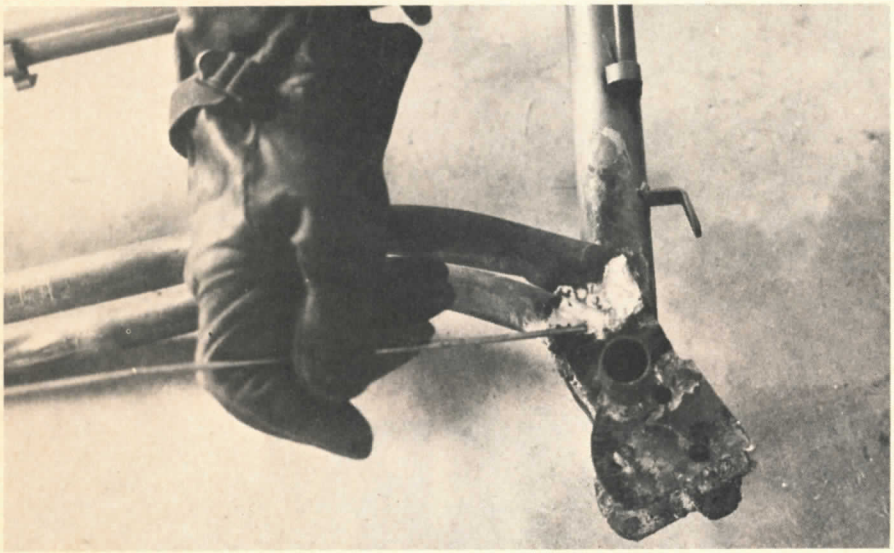
THE MINI RIDER



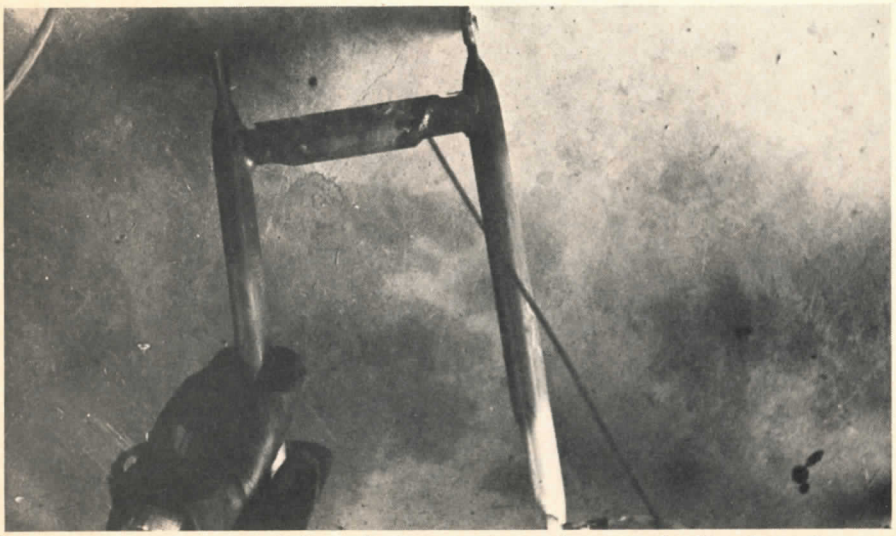
The power for this little special came from a "retired" Honda 90.



To match the Yamaha forks to the Ducati frame it was necessary to remove those portions of the frame which held the steering races. These same pieces were welded to the Ducati frame, plus two new braces to help hold the engine.



Next the lower ends of the new tubes were attached to the frame in their new mounting area.



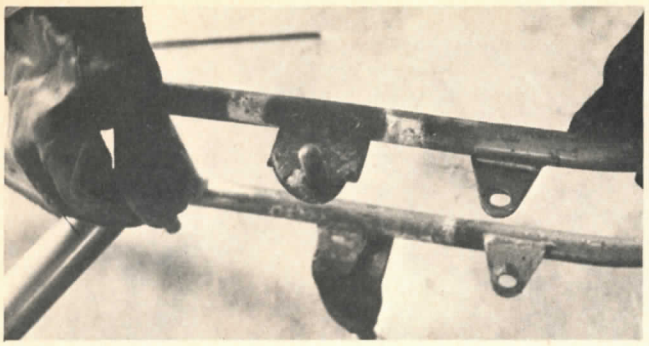
It was necessary to spread the swinging arm to conform to the Honda engine. The cross brace was cut and rejoined by slipping the next size larger tubing over the end and welding in place.

Yamaha forks and were welded into place. Here is a good time to remind the builder that in many cases the forks from one machine may be fitted to another by just changing the bearing races, either on the forks or the frame. Don't go into surgery without checking for this easier route. The rake and trail of the original machines were retained on this project, and when in doubt about such specifications, this is the practical way to go.

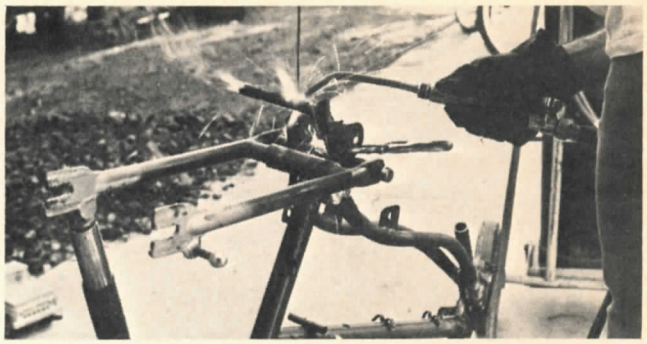
The next work that will have to be done on any machine will be dictated by the power plant you choose. If your project already has a useable engine, you will save time by making use of it. If a change of engines is in store, you may have to make extensive changes so here's what to look for. First, set up the frame with wheels installed, and then temporarily block the engine into place. Check for drive chain alignment with the rear wheel, and any front wheel/front fender to engine interference. Be sure and have the carburetor and exhaust system handy so they can be put into place and their routing allowed for. Case in point; it was discovered that everything would fit into place except the drive chain was going to interfere where it crossed the swing arm pivot. The remedy for this was cutting the swing arm cross brace and slipping the next size larger pipe over the cut ends. The arm was spread 7/8 inch and the larger pipe was welded to the cross brace to hold it in position. This modification was necessary as the Honda 90 engine was wider in the area of the countershaft sprocket than the original mill had been.

Now that the position of the engine has been checked, it is time to make the engine mounts. For this project, the bottom mount was made to attach to the plates that the original engine had used, and two new upper tubes were created to hold the mounts for the upper part of the engine. These tubes were bent and welded to the underside of the steering head. Now comes the final job of attaching the engine mounting tabs. You will save yourself a bunch of trouble if you first make the necessary tabs and bolt them onto the engine. Now take the engine and tabs and block up to the frame in the position you feel is correct. Now tack weld the tabs in place. When this had been done, the engine can be unbolted and the welding job completed. Do it this way and you can be sure that the mill will fit the tab holes, and that the engine is properly aligned in the frame. It goes without saying that the engine should be free from any gasoline or oil which might catch fire from the welding. Another no-no is never use the engine as a ground when arc welding. In the latter case, the high amperage current of the welder could short through the gears or bearings and either weld them, or pit them so badly they would have to be replaced.

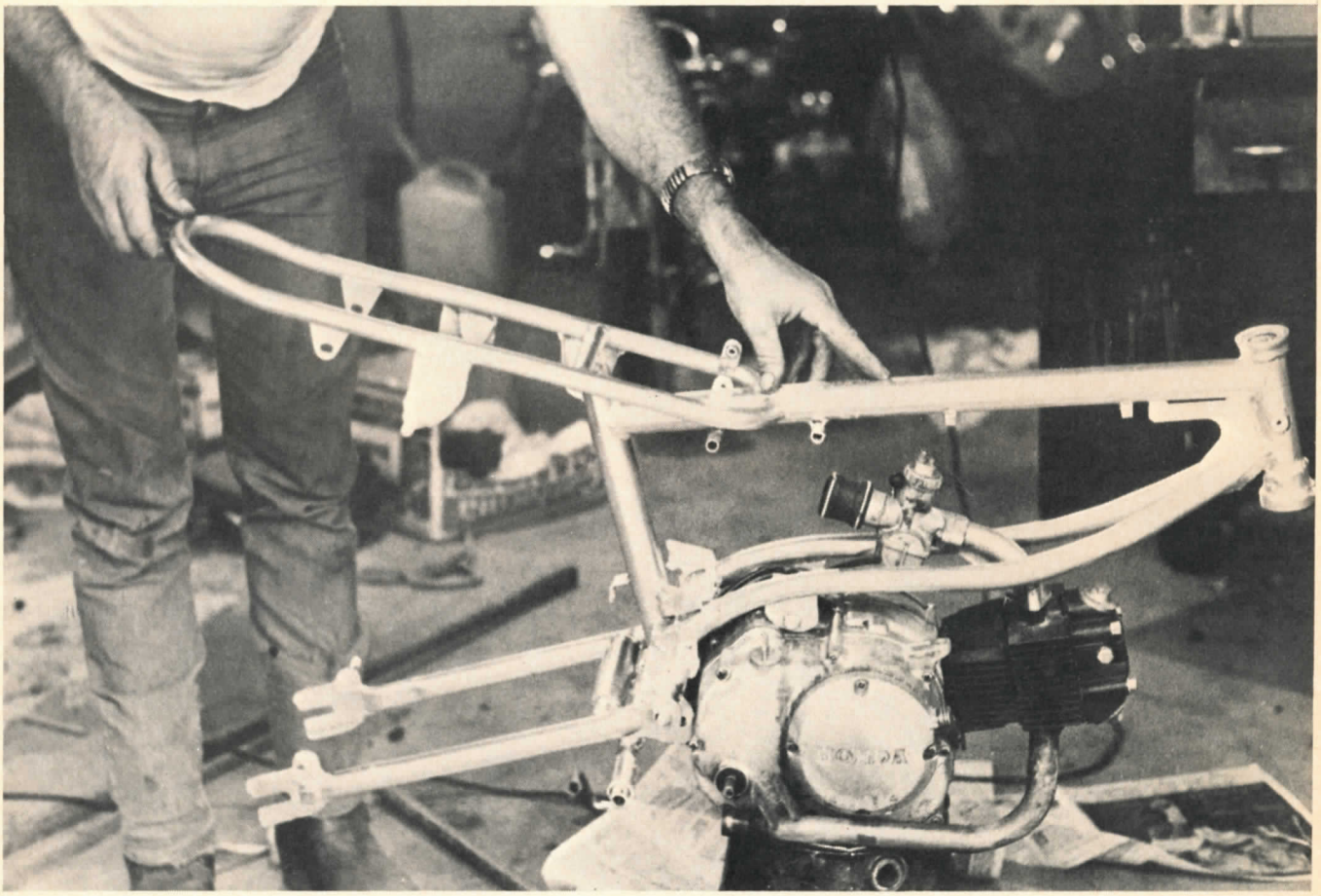
Before the welder was taken back



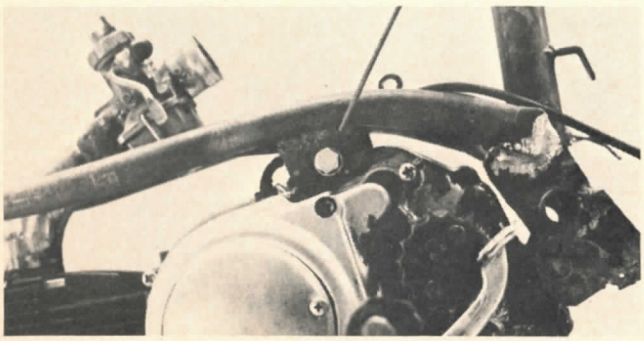
After changing the swinging arm the shock mounts on the frame were widened to match the new shape of the arm.



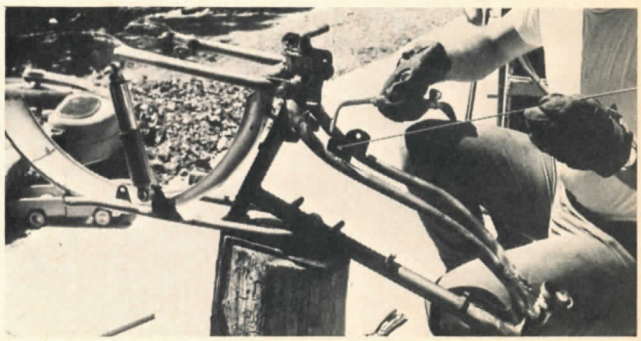
While you still have the welder, use it to attach such items as the brake pedal mounting.



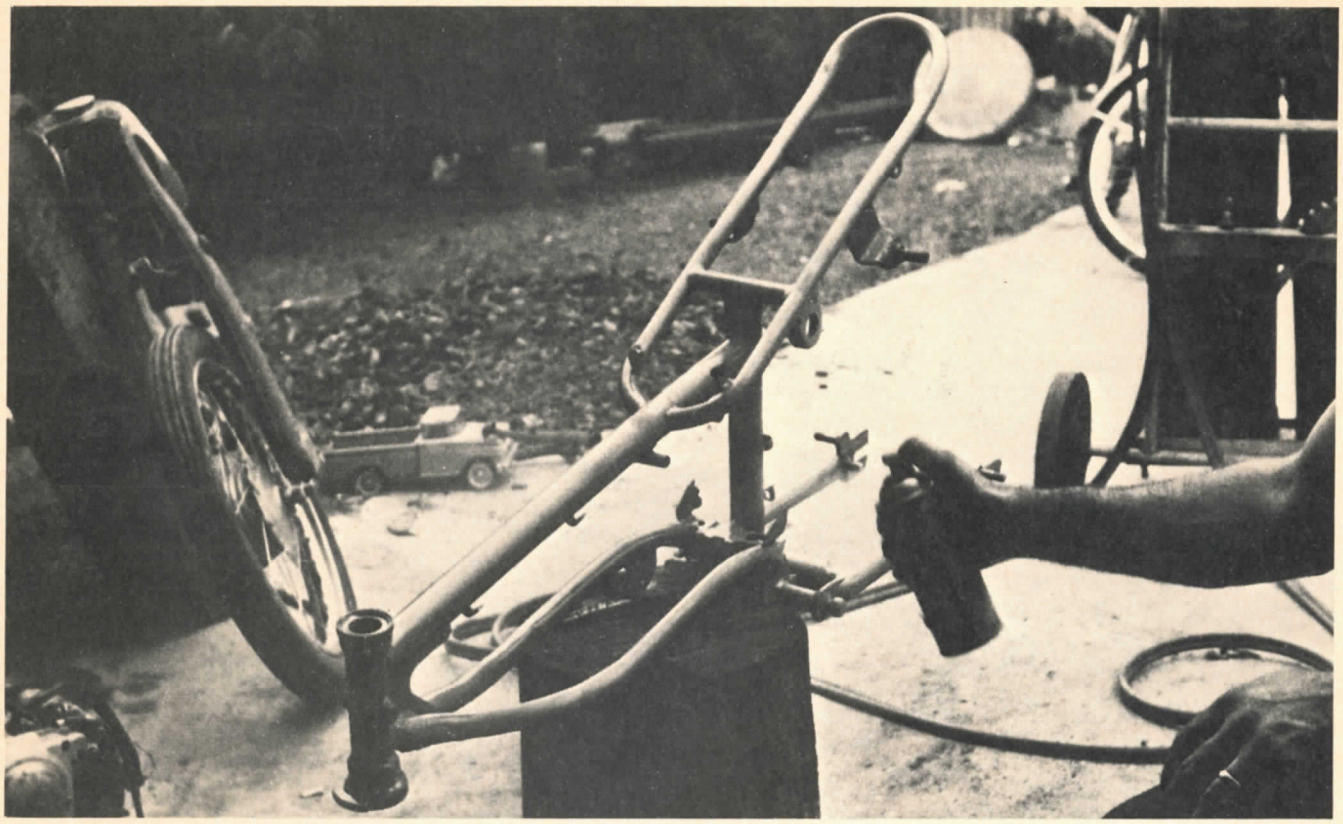
During the job it's wise to make many checks to ensure everything is still aligned.



Here is the engine bolted into place. Before starting the project make sure there's clearance for such things as the carburetor.



Any item that needs welding should be attached before sending the welder back to its home.



After the welding is completed the frame is now ready for painting.

Finally, after many hours of work, the mini starts to take shape and look like a motorcycle.

to the rental people, a check was made to attach the brakelight switch mount, ignition key, battery mount and any other items that require the touch of the welder. What John did on this project was to remove the wiring system from the Honda complete, and install it on the midi-bike. This gave all the necessary circuitry if the bike should be ridden on the road at a later date. It is always a good idea to use any existing parts or wiring from the used machines as it will save you a lot of time, money, and trouble when it is time to hang everything together.

The frame was coated with an application of primer and silver paint. Next the tank was smoothed and filled to erase the dents and was sprayed Honda red to match the rear shock covers. The seat got a new upholstry job and it was time to see if it would go. The engine fired right up, as Hondas usually do, and after some cautious first gear exploring, nine year old Laura was soon zipping around all over the place making Gold Star type noises with the little single. The engine had been left strictly stock, a new set of points and rings being the only alterations. The project was clearly a success. The lower center of gravity meant that the young rider could easily hold the machine upright and the low seat height made getting started no problem. Dad says he got a lot of pleasure out of putting the whole thing together. Not only that, but if he asks real nice, Laura will let him ride it – as long as he is careful not to tear it up.

For off-road use it's best to use folding footpegs. Now is the time to put them on.

The final shot shows one happy girl with her new toy.

Definitely the wrong way to go over a series of ruts is to sit in the saddle and land front wheel first. This tends to throw your weight toward the front of the machine with the possibility of disasterous results.

HOW TO

PRESTON PETTY TELLS HOW

By Preston Petty

For the man who would like to make a transition from weekend trail riding to dirt racing (moto cross, desert, etc.) he won't find a big difference in riding techniques. The basic techniques are the same, only the speed by which you must perform them is of primary importance.

There are three basic elements to racing; accelerating, braking and cornering. Jumping should be included for moto cross and desert. Uphill and downhill sections can be considered special cases of acceleration or deceleration. We will start off by taking you through braking, cornering and acceleration of a typical corner (if there is such a thing). We will then discuss a few special techniques one can use for different geometry in the turn.

Assume that you are proceeding down a straightaway at 50 mph approaching a 20 mph corner. There is a minimum distance required for the deceleration from 50 to 20 and this will vary depending upon surface traction and the braking power of the machine. The surface traction will be less for a hard surface with "marbles" (loose sand and dirt) on it, conversely

As referred to in the text, riding over a series of ruts or small whoop-de-do's is made easier on the rider by lifting the front wheel before you get to the rough spot and carrying the wheel over the bumps.

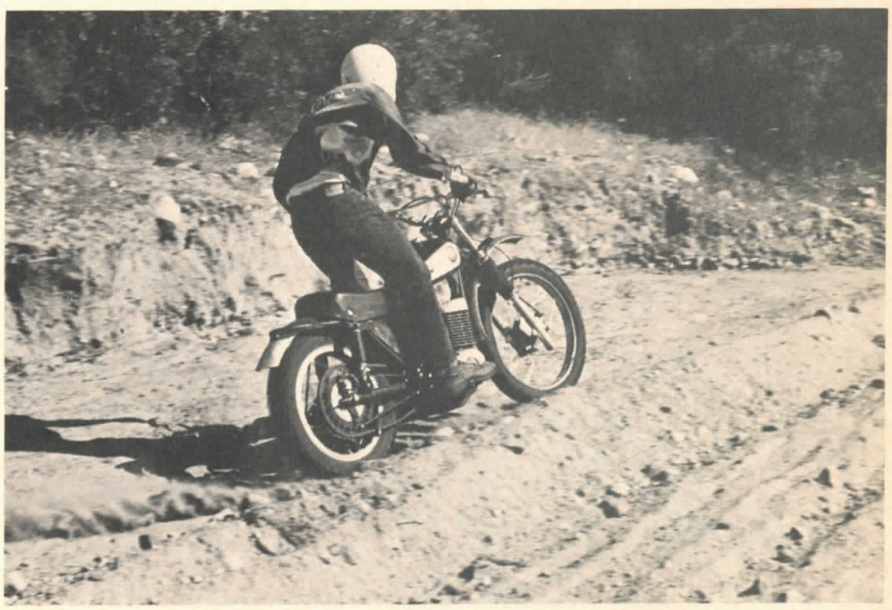
RIDE MOTO-CROSS

PART 1

LS HOW TO GET THE JOB DONE WHEN RACING IN THE DIRT.

Photo: Dave Hetzler

a soft, moist surface that the knobby tires can sink into the full depth of the knob will provide the best traction and hence a shorter distance to stop. Frequently, this softer condition can be found off to one side or the other of the "groove" (i.e. where everybody else goes). One very important thing to remember is that any motorcycle will require considerably less distance to slow down if both front and rear wheel brakes are used. In fact, most motorcycles will stop in less distance using the front brake only than using the rear brake only. Make sure you use the front brake almost every time you want to decelerate – just make sure the bike is not leaned over and that the front wheel is perpendicular to the ground. Back to the 20 mph turn, upon reaching the cornering speed release both the front and rear brakes and lean the machine over to the traction limit. It will be necessary to apply partial power to maintain speed. A small power slide around the corner is acceptable but too much power will cause the rear end to come too far around and your ear may come in contact with the ground. As you com-



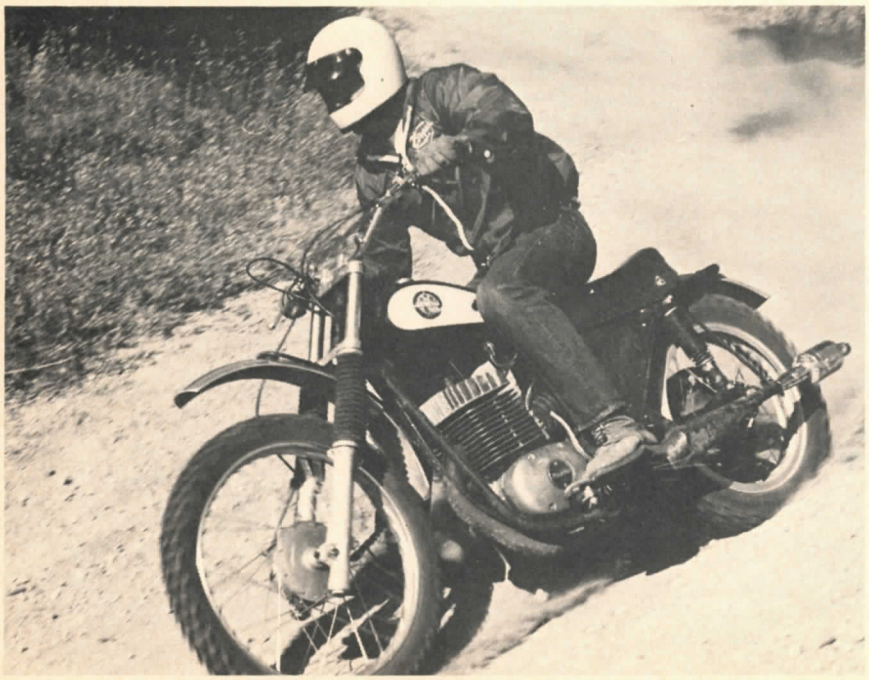
When riding in deep sand the only asset you have is speed. At high speeds the bike will actually get up and plane like a boat over water. When the tires are sunk into the sand control is minimal.

The use of the berm on the outside of a corner will allow you to go through a corner 5 mph faster than not using it. Entering the corner, allow the bike to slide towards the outside of the corner . . .

. . . Notice how I'm off the saddle and riding in a four point stance. One foot on the ground, one on the peg, hands on the bar. This allows the bike to jump around without disrupting me . . .

. . . Just before hitting the berm, gas the bike so the rear wheel hits first. This allows the bike to drive off the corner

. . . leading with the front wheel. Just before hitting the berm swing your weight to the inside of the corner, otherwise there's a chance of high-siding.



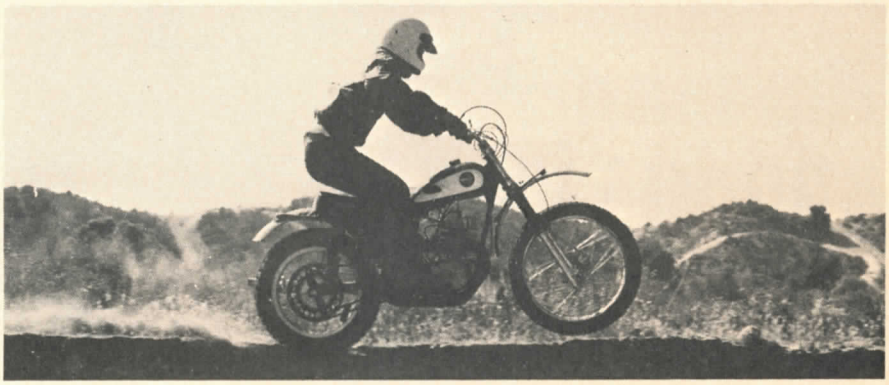
After coming off the berm the bike is ridden out of the corner just as if the berm hadn't been used.

plete the corner raise the machine upright and simultaneously apply the power. I usually "shove off" with my foot to lift the machine upright – then it must be able to go in a straight line – and apply maximum power as it straightens up. Shifting your weight to the rear of the machine will usually assist in maintaining traction.

WEIGHT SHIFTING:

Weight distribution of the rider and the ability of the machine to pitch rapidly without upsetting the rider are of the utmost importance. The only way to accomplish this is to get your bottom off the seat at least a few inches. You will be riding the machine with only your feet and hands in contact with it. Next time at a rough surface race track notice that *all* the good experts will ride semi-standing to permit the machine to move around without disturbing the rider. When you practice, or go cow trailing, ride with your bottom off of the seat – stand up, if you must and only sit down on a smooth straightaway. I know that it is strenuous – but racing is a strenuous sport. You will find that you won't fall down nearly as often.

Jumping a motorcycle is not difficult as long as some basic rules are followed. Here I'm going off a six foot dropoff and the method is as follows: When approaching the jump, shift your weight slightly forward in anticipation of moving rearward . . .



. . . Just before reaching the crest of the jump move to the rear. Give the bike a small amount of power and lift the front wheel before leaving the ground. . .

Even when cornering on a rough surface it is possible to semi-stand and still have one foot on the ground – practice supporting your weight with both hands and one foot. The rougher the course the more important this is. You will notice that in every picture I am not sitting down.

There is a sequence showing a straightaway with a series of bumps fairly close together. If you have the front end on the ground it will be thrown down when the rear wheel goes over a bump causing the front forks to compress and greatly increase the pitching action of the machine. If it gets bad enough the machine could pitch you over the handle bars or start a "lock to lock" which frequently causes the rider to go over the "high side." By standing up and shifting your weight rearward under full power, it will lift the front end of the machine up enough to where the front wheel won't even touch the ground until you're over the section.

JUMPING:

When going through a ditch or off a ledge apply a similar technique to lift the front wheel up to insure that you will land rear wheel first. In case of the machine being completely airborne it is best to leave the jump with only partial (1/3-2/3) throttle and when airborne roll it off to prevent excessive engine speed build up. An instant before touch-down apply full throttle and when the rear wheel touches it will have enough power to lower the front wheel more softly. Again, *after* leaving the jump, shift your weight rearward to lessen the chance of excessive wheel spin on touch-down. Make sure that the front end doesn't get much higher than one foot when airborne. If you thrust your weight rearward too early you can loop it easily. Study the four sequence shots in detail for the weight distribution by the rider.

MUD AND SAND:

These topics can be a chapter in themselves but a few major points can be made. Pull the tallest gear possible to get enough power to keep up speed. The faster you go the more control you will have. Make turns as wide as possible and use more power than usual. Again, get up off the seat and keep your weight shifted rearward to help prevent the front wheel from "bulldozing."

Remember practice is the key to proficiency and practice should be done in the weeks before you demonstrate your proficiency in a race.

. . . When you're in the air shut the throttle so the bike won't loop when you land. Upon landing ease on the gas because this will allow the front end to come down gently.

sammy miller,

the man and his ideas

TWO AUTHORS LOOK AT THE SAME MAN AND COME AWAY WITH DIFFERENT IMPRESSIONS

By Robert Schleicher and John Larsen

It was close to 2:30 pm when the amateur-expert trials riders moved out onto the course. In the lead wearing the big number one was Sam H. Miller. He was cruising into the 107 degree heat of Goethe Park, fighting the dust and narrow turns like the rest. He had laid out the course that the determined riders were trying to beat, he had held the school on the previous day to help them learn how to beat it. If trials riding gains the stature here in America that it now enjoys in Europe, history will give the quiet Irishman the credit for a first here too. It is unlikely that there has ever been a sport presented here in America whose success or demise will have been so closely linked to the efforts of one man, Sammy Miller.

Things are looking good for observed trials because success and Miller have been partners for many years. Born in Belfast on November 11, 1934, Sammy began to show a definite talent as soon as he began to ride at the age of twelve. It was not long before he scooped up the Irish Scrambles championship and by the time he was 20 he had won his first road race, the Cookstown 100 aboard a 350cc AJS 7R. He reached the top ranks on the road race circuit riding the works machines of NSU, Mondial, CZ and Ducati. 1958 saw him take 3rd spot in the 250cc class at the Isle of Man. During this time he was competing in the English trials events between road racing duties and was picked for the Ariel factory team. He won the British Championship crown in 1959 and has retained it ever since.

In 1964 he was retained by the Bultaco factory to build a championship trials machine and this lasting association with the factory helped bring him to our shores.

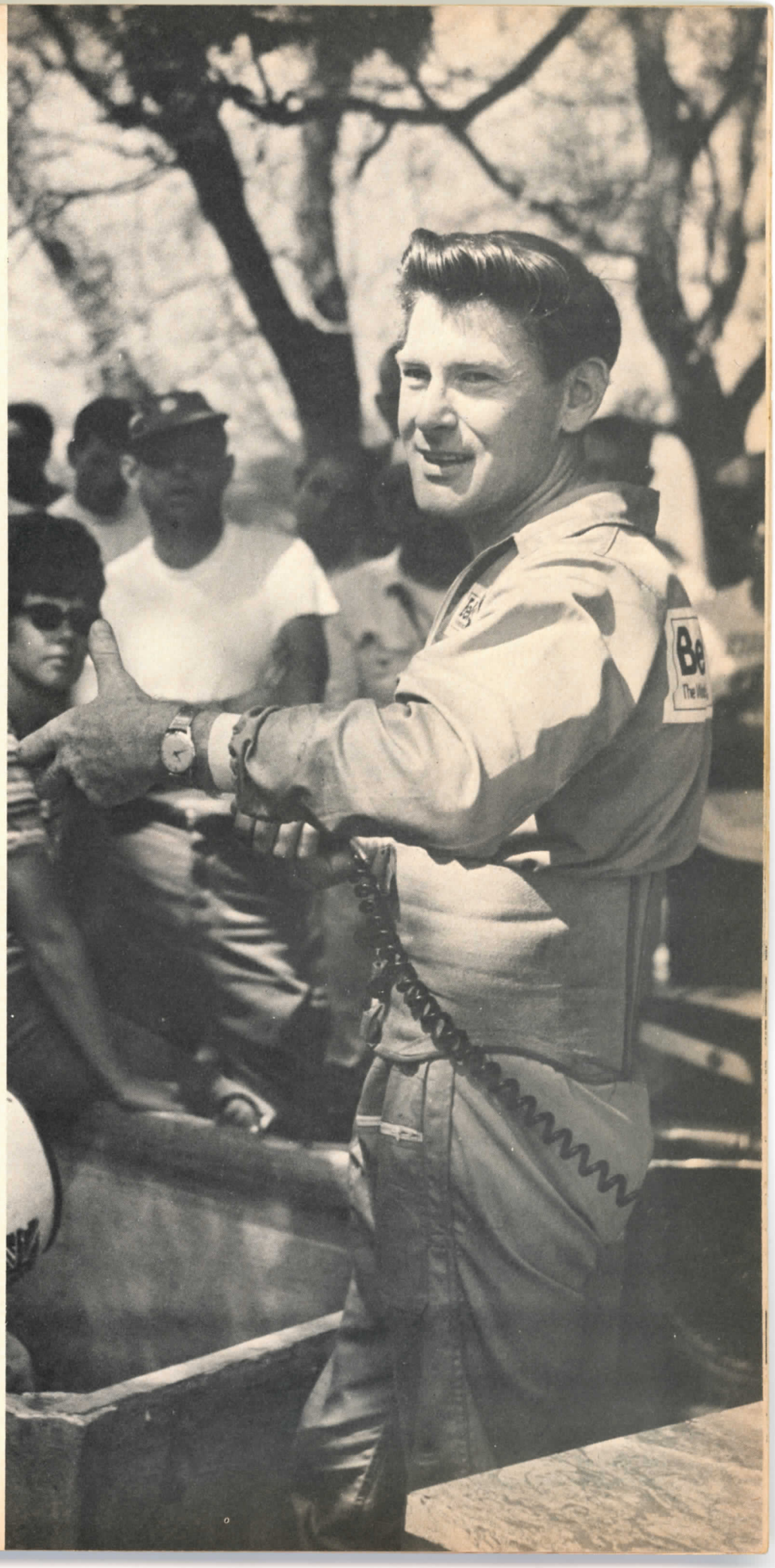
The impact that he has made could be seen at the competition held that day near Sacramento. Prior to the schools that Miller first held in 1968, the American trials events were usually a random affair, held occasionally by clubs who had little or no knowledge of what an actual observed trials was supposed to be. There was little uniformity between the events held in one place or another, and absolutely no organization. Miller had to educate most of the American riders from the ground up, starting with a proper course layout and then showing each aspiring trials rider what to do with it. This process cost the sport a few old hands who didn't like to be told they had been doing things wrong, but in turn has gained hundreds of new friends who have had their eyes opened to a whole new sport. The mainspring that made the Sacramento event happen was the Pacific International Trials Society. The Sacramento chapter did the actual leg work involved in supporting the school, and the trials, at Goethe Park. Trials events are now held under the flags of the Pacific Northwest Trials Association in Washington, Oregon and Idaho.

P.I.T.S., mentioned above, takes in Northern California and the Southern California Trials Association. These three associations mean that the entire western coast of the United States is now organized for trials, and again this is directly due to the influence of Mr. Miller.

Sammy had to lay out a tougher course this year than last for our riders have been quick to learn. The course was held mainly along the dry river bed that winds through the park and involved sections that writhed around downed logs, dived off the vertical banks of the river and snaked upwards again through rock and slippery sand.

The amateur-expert people soon began to sort themselves out as some glided through sections where others floundered helplessly. Some lost irreplaceable marks such as amateur Leon Wilbanks who cleaned the difficult part of section nine, only to miss the final turn and ride out of the section on the first lap and lose five valuable marks. This oversite prevented a three way tie for the first amateur spot as Wilbanks 54 marks put him third behind Jack Williams and Al Garrahan who ended up with 49 apiece. The rules call for the tie to be decided by the man who has cleaned the most sections, and both Garrahan and Williams had cleaned exactly the same number of sections! This left the next rule for breaking the tie to be decided by the man who cleaned the most sections first, and this final ruling gave the nod to Williams. That's about as close a tie as it is possible to get. The fourth place trophy went to Mike Chubick with a total of 69 marks lost. The expert hardware was split up between Victor Boocock who lost a very respectable nine, Paul Olliges second with 34, Jack Ward closed out with 45 and Richard Hood with 55. Sam Miller does not compete for any of the honors, but was first overall by losing only six marks.

The majority of the 115 competitors were made up of novice riders. There was trophies awarded for the first four open class riders, and also for the first four 125cc Novices. The winning open novice rider, Arlie Webb, came out of the last section with a healthy loss of only 20 marks, followed by Dean Manly with 28. To put this into proper perspective, it should be noted that the course was toughened up for the amateur-experts and they also ran five laps rather than the novices required four. The 125cc Novice cup went to Greg Chubbick, 39 and Robert Miksch, second with 49. This was a record success for a trials event and the thermometer even got into the spirit of the thing and came up with 108 scorching degrees, which must set some sort of a record for torrid trials.



World's trials champion Sammy Miller instructs a crowd of English trials fans on the form and art of the sport at SoCal's Saddleback Park trials area.

Miller recommends that any rough areas be ridden with all of the rider's weight fully on the footpegs. Bars are set for comfort in a standing position.

Downhill travel requires a shift of the rider's weight toward the rear of the machine. Brakes should be used with care not to allow either wheel to lock.

The heat is the thing that Miller liked the least during his '69 trip. For that reason we had accepted Tom Patton's invitation to join Patton and his wife at the Cordova Inn where Sam was staying. When we arrived we were greeted by the Vanguard of the PNTA, Williams, Wilbanks and Pete Lybecker. We were soon seated by the pool where Sam soon joined us and we began shoving questions as soon as he was seated. One of the first things that we asked was how he rated this year's riders. He prophesized that we would be seeing a much better class of riders this year as compared to the last, and the trials had proved this to be true. He liked the better organization which was evident and the generally good equipment which the riders were using. We soon went to his room to catch the news report on T.V. and were particularly interested in the observations of Chad Southworth. Chad knows Sacramento like Laurel knew Hardy and was good enough to guide us in and around town by all the fastest routes. He was skeptical about the forthcoming newscast as in the past the T.V. people have given good coverage to the outlaws only. Low and behold! what do we see but a very good coverage of the trials scene. Everyone felt a sense of triumph when it had ended.

When the whole Sacramento scene had ended, and we were headed back home, there was time to do some thinking. Sammy Miller is not the easiest person to get to know. When you ask him a question, he replies with a quick direct answer but he does not take the opportunity to ramble on. He says the least of all about himself. Tom Patton told us that he is rather shy, and doesn't care for a bunch of people hanging over him. When you consider this, coupled with the fact that he comes here to teach the art of trials, it means that it is quite an effort for him to get up in front of a group of people and conduct these schools. You might ask, Why is he here?

One reason he has made the trip is to promote the Bultaco machines that he helped design and also because he runs a custom accessory house at 466 Lymington Road, Highcliffe Hants, England, that handles a unique line of trials parts for Sprite and Greeves as well as for Bultaco. The thing that you don't expect is that at no time does he try to sell you anything, made either by Bultaco or himself. You have to come right out and ask him about the accessories or he is likely not to mention them.

The tour that he makes is filled with rush trips and tight schedules so you wonder how enjoyable this may be, going through it for the second time. Having had the opportunity to visit with him in both '68 and '69, we have come away with a strong impression that the one predominant reason Miller has gone to the effort to come here is not for the prestige or monetary gain, but rather because he is a dedicated man. In one of the few

times that he did speak his mind he spoke of the goal that he wants to see achieved. He sees the sport of trials in the same light as most Americans consider the game of golf. There is a good parallel between the two sports, as in both cases the man is pitting himself against obstacles of nature. Both games are contests of skill, rather than speed or daring. He knows the potential that lies in the future for trials in this country and has a vision of bringing it into being. We feel that this is the principle reason that he came. For this same reason he may come again, and who knows, he has a habit of making a success of things and even carries with him the luck of the Irish.

The whole idea of English Trials is for the rider and machine to be able to negotiate the worst possible terrain with the rider still in full control. This full control, to the trials folk, means that both of the rider's feet remain on the footpegs, and that the rider doesn't kill the engine. Points are deducted from a perfect score for each deviation from "perfect control". Sport riding trail riders and/or motorcycle riding hunters and fishermen will find themselves traversing much of the tricky terrain the English Trials fans prefer on their way across the boonies. You obviously won't have anyone scoring your progress through the woods, but you will find it darned unhandy if you end up with the machine on top and you beneath. The tricks of the trials riders can make you a far more self-confident and proficient trail rider. And, if you're going to ask advice of an English Trials ace, why not pick the best in the world; Scotsman Sammy Miller's ideas (in *our* words) –

First: even a trail rider will find himself in more control of his machine if his entire weight is actually on the motorcycle. All of your weight can be carried through your feet (yeh, just like when you stand up), so keep both feet on the pegs until you're sure the motorcycle is irretrievably on the way to dropping on its side.

Second: keeping your weight on the motorcycle does not mean to glue the seat of your pants to the saddle. Whenever the going gets rough, stiffen up those leg muscles and lift your backside at least an inch or two from the seat.

Third: control of your motorcycle is accomplished through the handlebars and through the transfer of your weight (often termed "body english") from side to side or from front to rear wheel. You can increase the effectiveness of your weight transfer if you make a habit of gripping the sides of the tank and/or seat with your knees – you then have your feet, knees, and hands in contact with the machine to feel its movements beneath you and to use as leverage to lean the machine where you want it.

Fourth: ride at as fast a speed as you are confident you can still control the machine – riding too fast can

On steep uphill ascents, the rider's weight is shifted up near the bars. More leverage and control can be gained if rider's knees can grip the tank or seat.

Even the experts "step off" occasionally. Leave hands on the bars, with throttle shut off and front brake on, until the last possible moment.

The author heads into section six. He, like everyone else, enjoyed the meet.

Victor Boocock, originally from England, garnered the expert honors.

Richard Hood cleans section ten.

force the motorcycle to bounce and self-steer its way out from under you. On the other hand, a certain amount of momentum will help to carry you over obstacles that could bring you to a most abrupt halt at ultra-slow speed. It is far easier to balance a moving motorcycle than one at rest.

Fifth: when riding downhill, avoid using the front brake alone and use a feather-touch on the rear brake to keep from locking up either wheel. A locked front wheel inevitably flips it toward full-lock (and you over the bars), while a locked-up rear wheel has little effect on reducing the machine's speed – it just tries to slide out from beneath you – keep both wheels rolling at just the speed necessary to keep them from actually skidding. Sammy feels the two-stroke compression release to be of little value – the time lag between the release and its effect in increasing the braking effect of the engine with closed throttle can be just enough to allow the machine to speed up beyond control. Further, when the compression release is let out, the motorcycle can take a sudden leap forward, upsetting the rider's full control. Mr. Miller does admit, however, that the two-stroke compression release can be of value to the beginning rider in slowing the rear wheel without locking it.

Sixth: the handlebars should be adjusted (or, better yet, the footpegs relocated rearward) so the rider's weight, with his hands on the bars, falls naturally on his feet. The hand controls should also be adjusted so they can operate comfortably from a standing position.

Seventh: the motorcycle, even if it is just used for sport, should be kept in a constant state of cleanliness. It is far

The competitors await the start of the novice event.

easier to spot a faulty weld, or a loose bolt, if they are not hidden beneath a layer of muck. The control cables, levers, and all bearings should be lubricated and wiped clean at intervals so they will work smoothly through the full extent of their travel. As obvious as this may sound, the clean off the road motorcycle is the exception in most areas, even at the start of a days sport and/or racing.

Eighth: for most types of trial's terrain, tire pressures should be ten pounds per square inch or less. Sammy's Bultaco Sherpa T Trials machine usually carries only 6psi in the front and 4psi in the rear tires. Exceptionally sharp rocks would force the rider to increase the inflation pressure to nearer ten psi to keep from denting the rims and/or pinching the tubes.

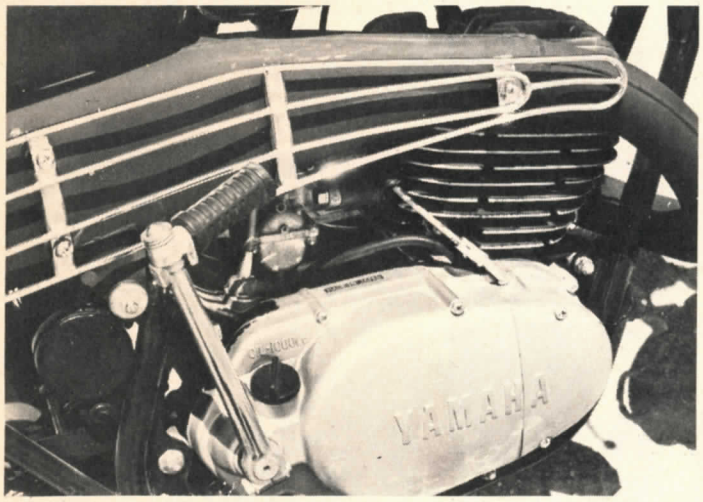
Ninth: the overall gear ratio of the machine should match the engine's speed to the terrain covered. Most 100cc machines should carry the near 40:1 gear ratio Mr. Miller recommends for the Bultaco Lobito, while 250cc sized bikes will likely need the near 30:1 ratio used on the Bultaco Campera. Surprisingly few of the so-called "trail bikes" or "scramblers" are delivered from the factory with appropriately low gear ratios.

Tenth: keep that front fender in place. You can't see that rock or drop-off with sand in your eyes kicked up by a fenderless front tire. In muddy areas, the front tire can kick up enough mud to tightly pack the cylinder's cooling fins, causing the engine to overheat and, eventually, to seize. Even the Southern California desert racers are carrying front fenders on the off-chance that a mud hole may be part of the course.

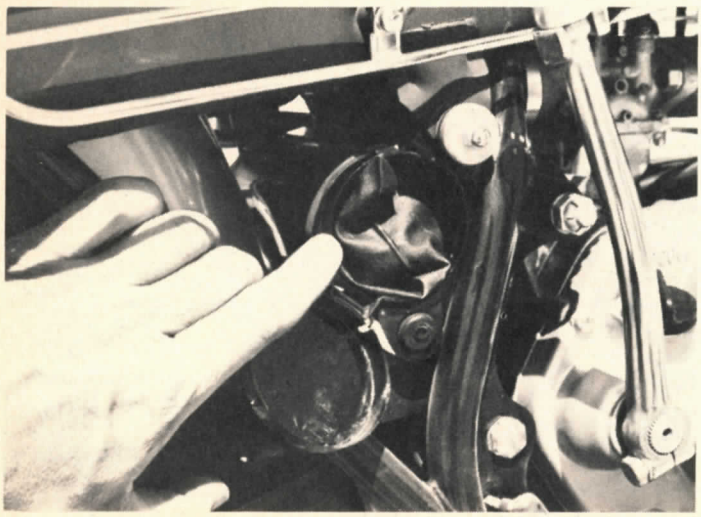
The only competitor to ride less than a 250cc machine in the Am-Expert event bends his way through section one.

The action included some downhill wheelies.

The front forks worked much better, off the road, when the oil was changed to a heavier weight.

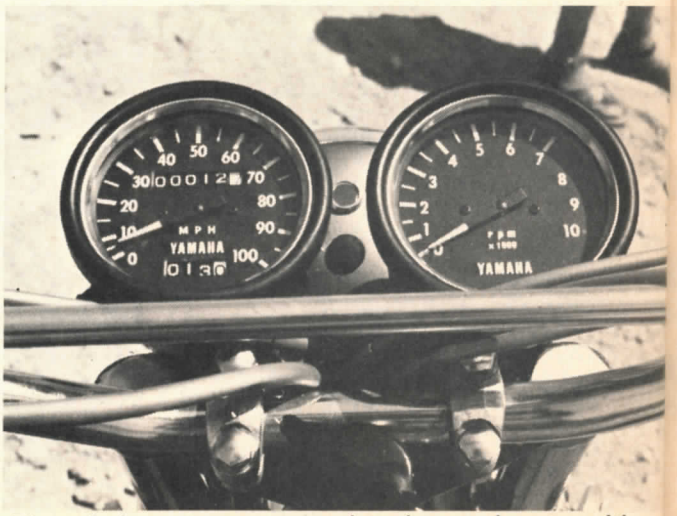


A chrome wire heat guard protects the legs from burns. The pipe itself is indented in the area where the leg normally falls.



A nice sized tool box carries enough tools to make minor repairs in the field.

Another Y



The only instruments are a tach and a speedometer with a re-settable trip odometer.

YAMAHA 250

Yamaha makes 250's other than the road racers tested elsewhere in this magazine. Without a doubt their most popular machine is the 250 Enduro, a single cylinder combination street and off-road bike. Even though most of the Enduros sold never see the dirt, most people buy them because they want to think they'll get the chance to ride them in the hills, this even if they live in downtown Manhattan.

It's hard to fault this kind of thinking. Besides being a fine road bike and a good dirt machine, the Enduro is one of the best looking bikes around. And more bikes are sold on looks than anything else.

We had better state that the Yamaha Enduro, or DT-1 as Yamaha calls it, is more than a fine appearing machine. It performs as well as any street single, with the added plus of Yamaha'a reliability.

The Scrambler craze, at least in the bigger machines, started two or three years ago when Yamaha brought out the first DT-1. They must have done some strong market research because this bike hit at just the time Americans were looking for a "trail" bike larger than 100cc. Since they introduced the Enduro other manufacturers have duplicated Yamaha's effort, but being first has its advantages and no one has even come close to Yamaha's sales in this particular field.

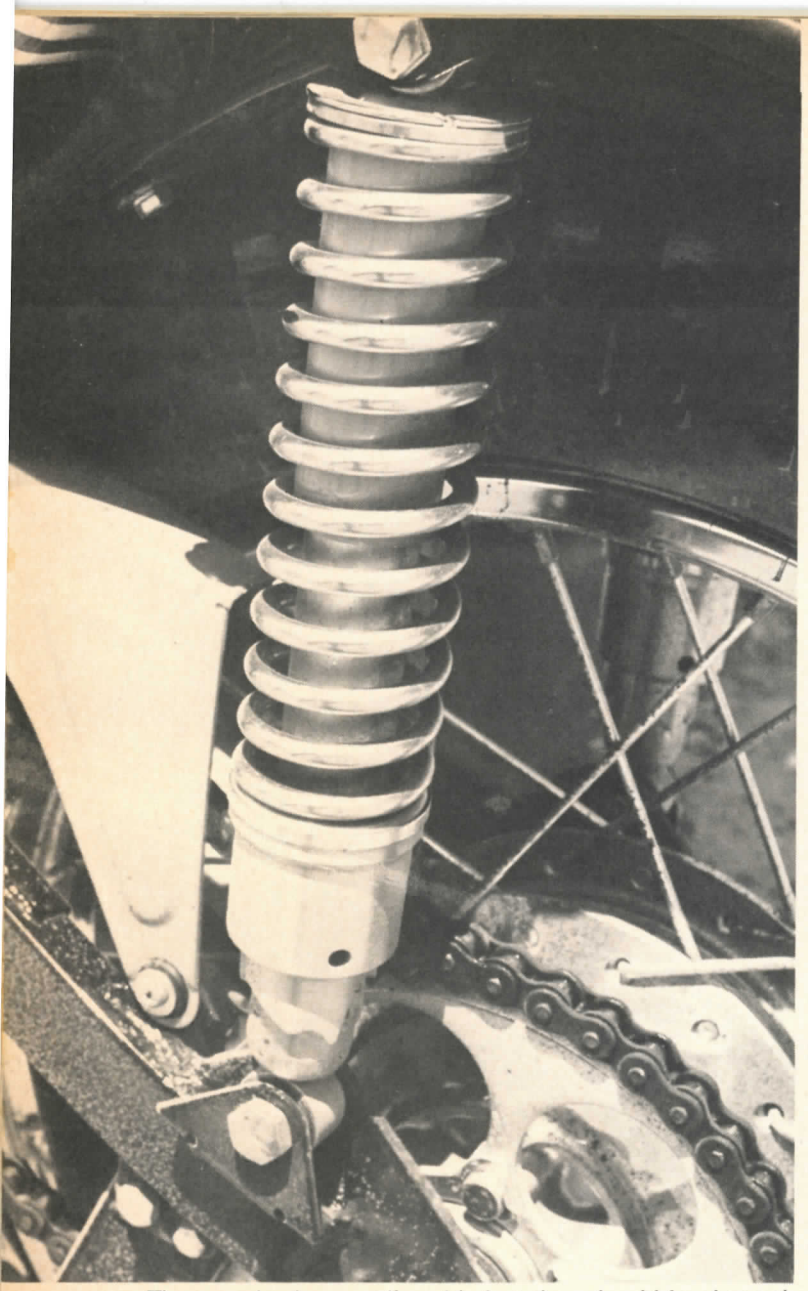
Other than the aforementioned good looks, the DT-1 has many things going for it, not the least of which is the well engineered engine. Surprisingly enough it doesn't use a rotary valve for induction, it's just a basic port times mill that developes 22 horsepower at 7,500 rpm.

The cylinder utilizes a pressed steel liner in an alloy barrel. Even though no rotary valve is used, the transfer system is the five port type. Yamaha introduced this to the world on their 250 road racing bikes two years ago. A side point is most of the Yamaha models use this style of induction because of the wide power band it encourages.

If you want more than the 22 horsepower, Yamaha makes a GYT kit (Genuine Yamaha Tuning) that increases the power to 30. The kit includes a new cylinder, piston, exhaust pipe and other miscellaneous gaskets and small parts. In this form the DT-1 is very competitive on the dirt racing tracks.

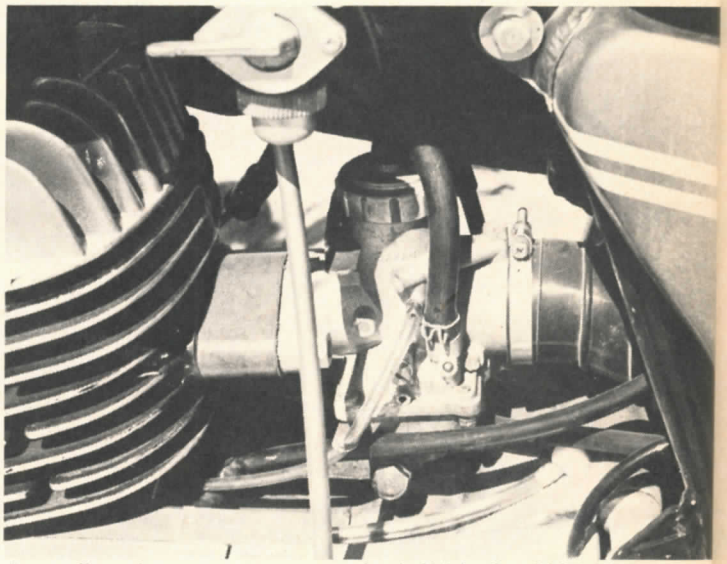
The transmission is a smooth shifting five speed that is rugged beyond belief. Best of all, the internal gear ratios are spaced in such a way that there is always a gear for any given situation. If the bike is going to be raced this is an added plus.

The semi-cradle frame has double down tubes that extend under and



The rear shocks are adjustable but they should be changed if the bike is ridden seriously off the road.

The seat flips up to reveal the filler for the remote oil tank. Also located here is the battery.



A small carburetor comes standard. With the GYT kit a 30mm unit is provided and it adds life to an already lively motorcycle.

around the engine and join with the main frame tube member under the gas tank. Besides being strong this configuration is light, so much so the whole street-ready machine weighs in at just over 230 pounds. In racing trim it scales down to 215. The swinging arm, like the road racers, is boxed for strength. We found it had no tendency to flex under any strain we put it to.

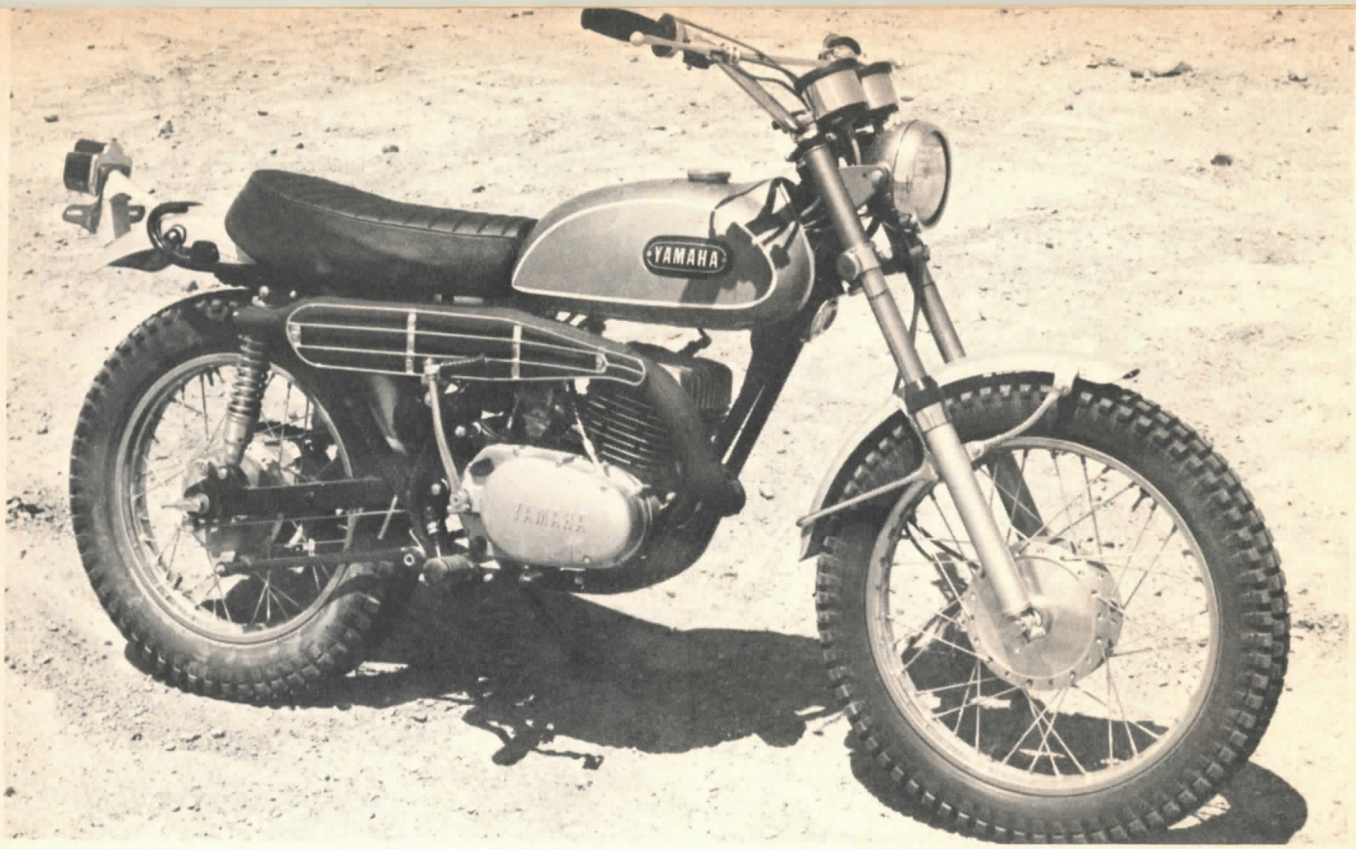
One area that could stand some improvement is the suspension. The front forks were helped by the addition of heavier oil but the dampening rates of the springs could stand some modification. The rear shocks are best thrown away and then start with something new, like Cerianis or Girlings. However, all these modifications are only needed if the bike is to be ridden off the road a great deal. For straight road riding the suspension works fine and no changes are needed.

If the bike is to be ridden more on the road we suggest a change of tires. The bike comes equipped with Dunlop Trials Universals which are just what they say, universal. Being this way they're not the best for either street or dirt. Yamaha can't be faulted for this. There's no way possible to equip a bike with a tire that's good for both street and off-road.

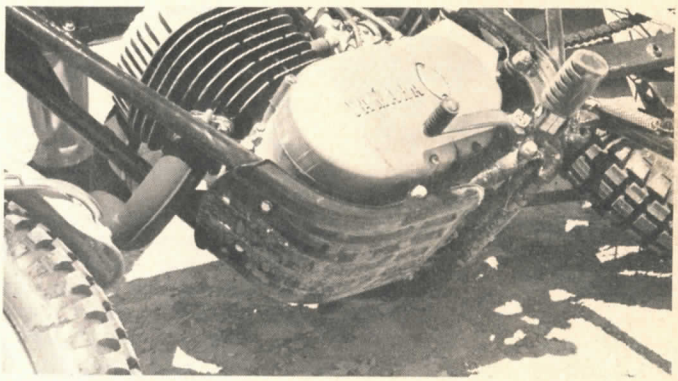
Mounted in rubber just in front of the moto-cross handlebar style is the tach and speedometer. In these are a headlight high beam light and a neutral indicator. Other than this the bike's instrumentation is spartan. One nice feature is the re-settable trip odometer. On a bike named Enduro, not having it would be a sin.

Like all Yamaha's, the brakes found on the DT-1 are outstanding. A single leading shoe unit is found at both ends; a double leading shoe front brake is too much when off the road. On the pavement the standard brakes work fine and show no desire to fade, even if a bit of impromptu road racing is done.

The DT-1 is the most successful model Yamaha has ever imported. During this summer every bike was sold long before it ever made it off the boat. Hopefully next year Yamaha will receive all they need of the exciting model. If they do there's no telling how many they might sell. As things stand now it seems every third bike to pass you on the road is an Enduro. And well it might be, it's a heck of a motorcycle.

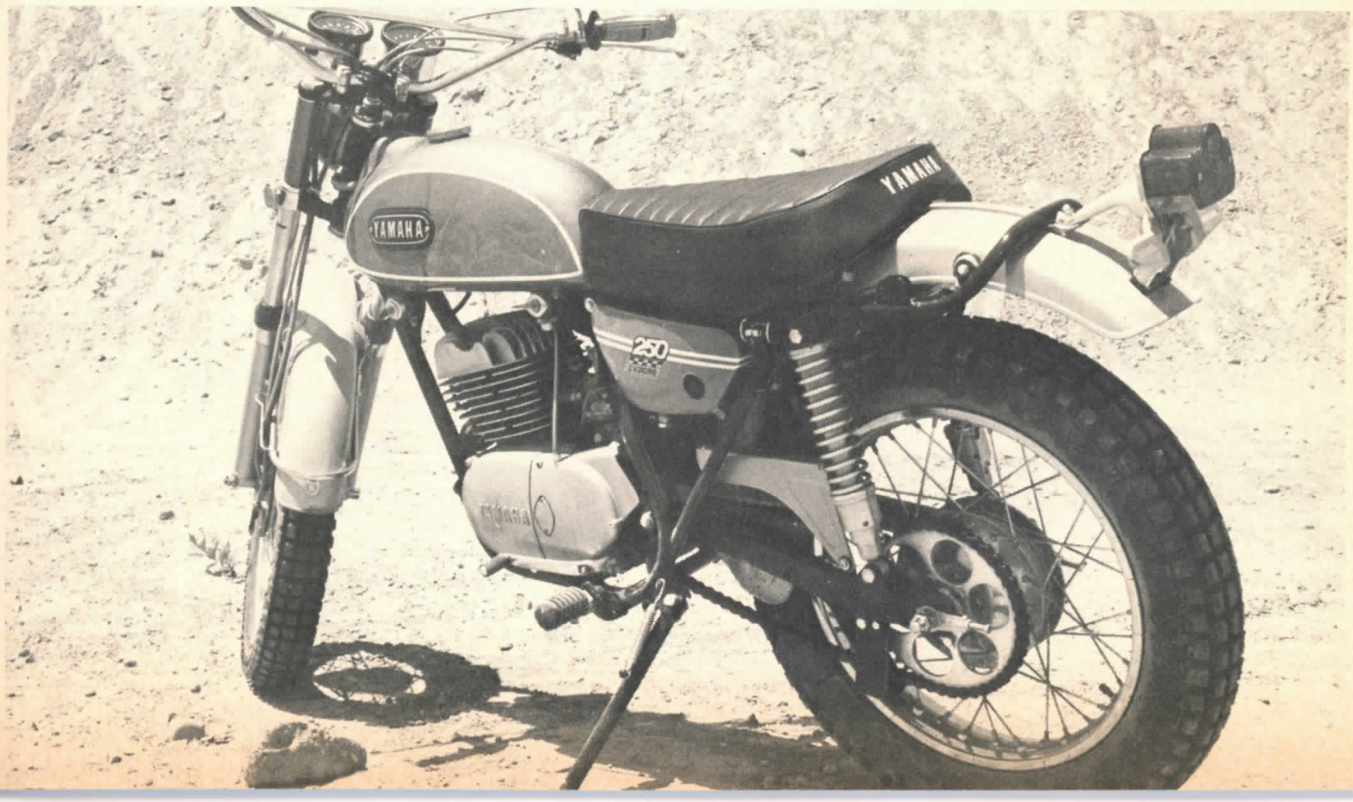


An overall view shows the racing look of the Enduro that is so popular with the motorcycle buying public.



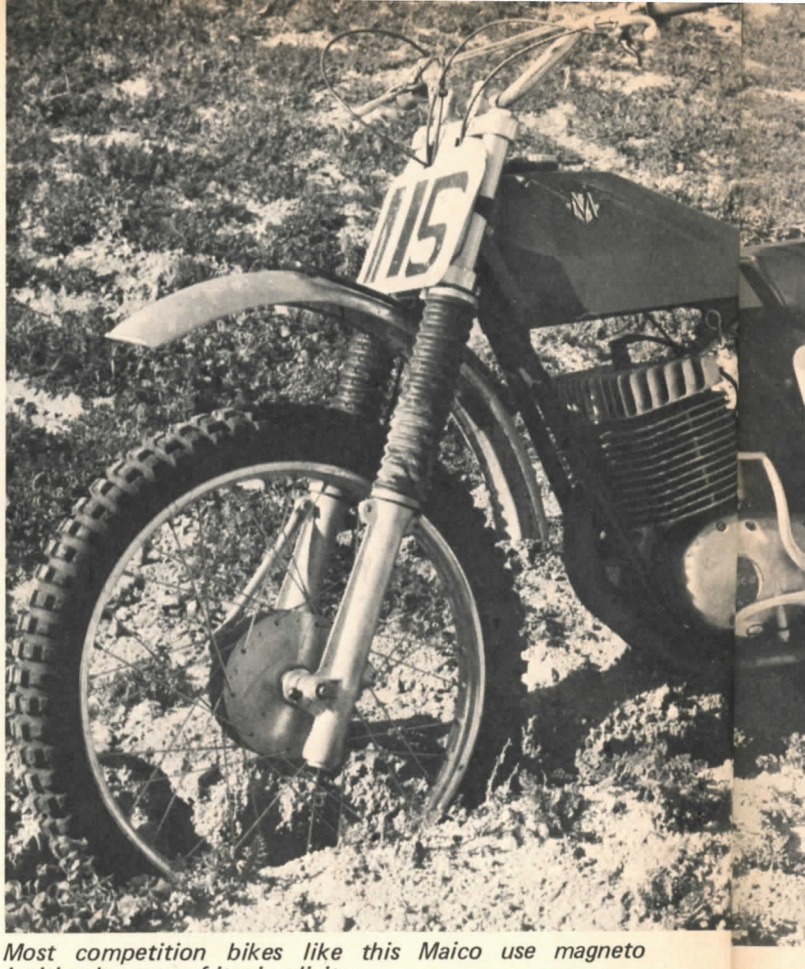
A sturdy bash plate is standard equipment and should be a must for off-road riding on any motorcycle.

No center stand is provided and it's probably just as well. In the dirt they have a tendency to let the bike down — hard.



Trouble Shooting IGNITIONS

HOW TO KEEP THE FIRE IN THE HOLE



Most competition bikes like this Maico use magneto ignition because of its simplicity.

By David Andru

A few years ago motorcycle electrics were a basic thing. Magneto ignition was about the only method of lighting the mixture in the cylinders. All that's changed now. There are still magnetos but they've been joined by coil and batteries, energy transfer systems, and for some types of competition, total loss systems. Let's look at some of the various set-ups and see what makes them tick, or fire, as the case may be.

The simplest arrangement is the alternating current magneto. a coil of wire is rotated in a magnetic field, or sometimes it's just the opposite with a magnet being turned within a series of coils. This spinning movement produces electricity which is passed on to the spark plugs.

Making sure the plugs receive the jolt of juice at the right time is the job of the points. The points are timed to the crankshaft by means of an ignition cam which makes sure the charge of electricity is discharged at the right time.

Most Japanese cycles use what is called a flywheel mag, especially two-strokes. The magneto is keyed to the crank and as soon as the engine is turned over it starts producing electricity.

At this point a problem arises. A racing bike without any accessories doesn't present any problems but on a street machine there's items like lights, horn, and possibly an electric starter. Magnetos do not produce enough electricity to run all these items and so a secondary power source is necessary. This of course is a battery.

To turn the A.C. current into D.C. so the battery can be charged is done by a rectifier. By maintaining a full battery, full in terms of an electrical charge, the magneto can keep it charged and thus the accessories like the lights will run without flickering.

Trouble shooting a mag if the bike won't start is fairly simple. Some of the things to look for include: insulation of the wires fraying. If this happens a bit of electrical tape will cure the problem. If a great deal of oil is found in the magneto the crankcase seal is suspect. This repair is best left to your local dealer as he will have the special tools necessary to replace the deal.

If the mag has a kill button it's possible for the carbon brush in the button itself to have broken and pieces of this can cause a short. There is a carbon brush in the pick-up of the mag. Make sure this is in good shape and is not cracked or any oil is on it.

Another method of providing spark for the plugs is the energy transfer system. A variation of the battery/coil/alternator system, it's used on many small machines and a few larger ones. Current, instead of running from alternator to rectifier to battery, runs from two magneto-like coils inside the alternator directly to the plugs. The accessories are also A.C. powered directly from the alternator and the

battery charged from a rectifier that is in the system.

On trouble shooting this system one thing that doesn't happen very often, but if it does it's almost impossible to detect is the air gap in the rotating magnets themselves. If the magnets have loosened on the key-way on the crank, it is possible for the magnets to touch the coiled wire and short out. Like we say, it doesn't happen very often but when it does, look out.

Still another method of lighting the fire is the D.C. generator. The generator is very basic, consisting only of an armature that turns inside of wire coils. This set-up produces only low-tension voltage so a booster, in this case an ignition coil, is required to fire the plugs. The difference between the generator and the alternator is that the alternator produces A.C. voltage and the generator D.C.

A voltage regulator similar to that found on a car maintains a steady flow to the battery to keep it charged.

Yet another popular spark lighting arrangement is the A.C. alternator. Similar to the magneto, it's even more reliable.

The alternator consists of a magnet that rotates inside of a number of coils. Like the mag, this spinning produces electricity even though there is no contact between the coils and the magnet.

The A.C. alternator produces A.C. voltage so a rectifier is inserted in the system to change the A.C. to D.C. so the battery can be charged. The direct current produced by the battery is used to power the lights, horn and other accessories.

If your bike won't start and you know it's getting gas, here's a few things to look for.

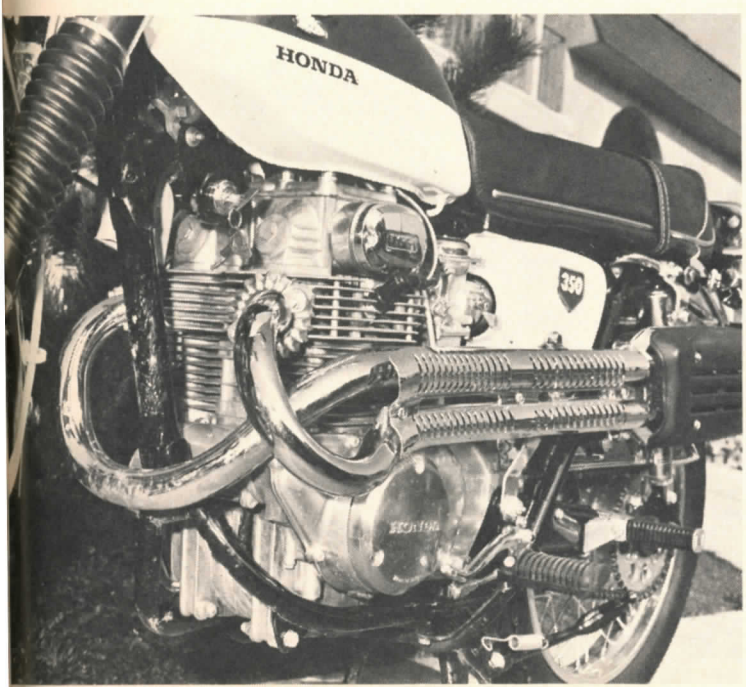
First check to see if the battery is charged. This can be done by turning on the lights or shorting across the battery terminals. Also it's good to check the battery terminals themselves. If they're corroded it can cause trouble in the system. Clean them with baking soda mixed in water and put some grease on the contact point.

If your battery keeps running down there's two things that can be wrong. The first is simple, the battery might be bad. The second is that the rectifier is damaged and bleeding off voltage to ground. It's also possible, if the rectifier is damaged, for the juice to run back through the coils and demagnetize the rotor.

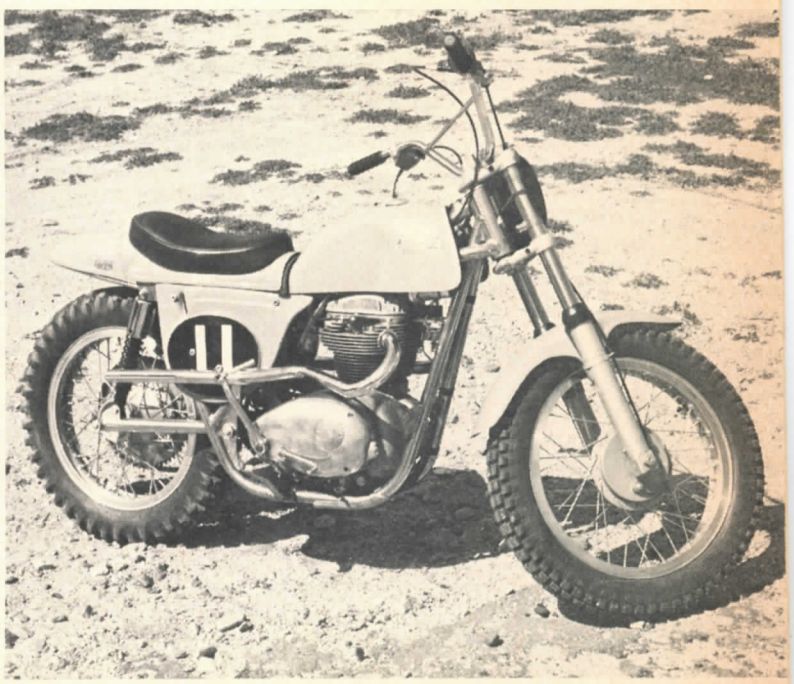
Another area to check is the points. If they're dirty or covered with oil they won't pass the charge properly. In a pinch they can be partially cleaned with a piece of heavy paper like a business card.

You should always make sure the spark is getting to the plug. This can be done by removing the plug, hooking back up the primary, or plug lead and laying the plug on the engine so it will be grounded. Kick the engine through and see if a spark is made across the plug. If the plug is fouled, the spark might not jump the gap so use a new plug if one is handy.

That's about it. Ignitions aren't difficult if they're attacked properly and systematically. Do it right and you'll be rewarded by a fine running motorcycle and isn't that what you want?



Many Japanese machines use the A.C. alternator to provide the fire.



On big English bikes the energy transfer system is very popular.

The Newest HONDA 90

A REAL MOTO-CROSSER

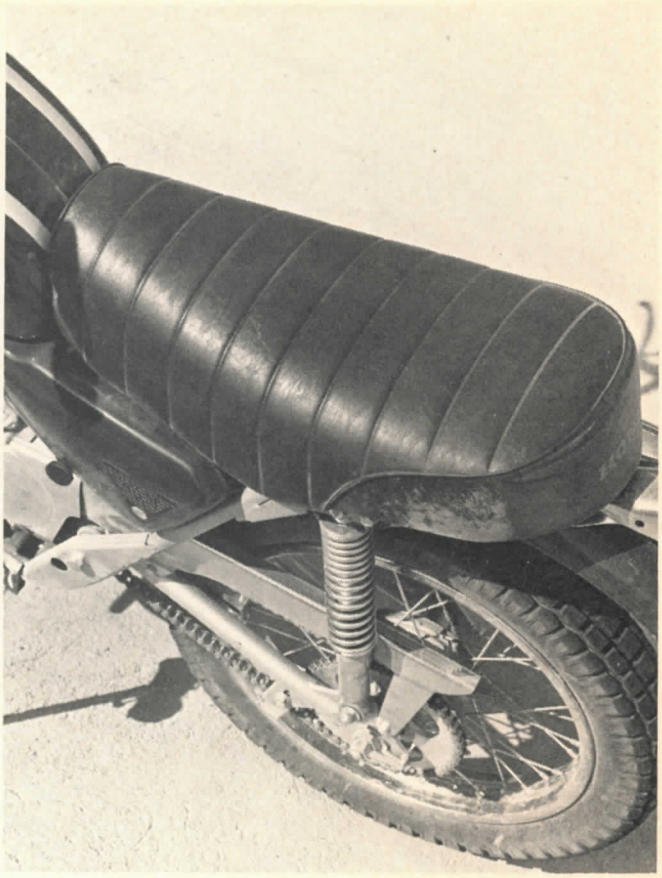
It's pretty hard to make any firm statement about motorcycles. What's true today might not be true tomorrow. However, one fact that holds true today and undoubtly will tomorrow is that Honda has sold more 90/100cc machines than anybody else.

Honda doesn't have a 100 but they have the 90cc and since it was introduced they have sold over 500,000 in this country alone. The popular overhead cam engine can be found in the Super 90, the Trail 90, the Street 90, and most recently, the Moto-Cross 90.

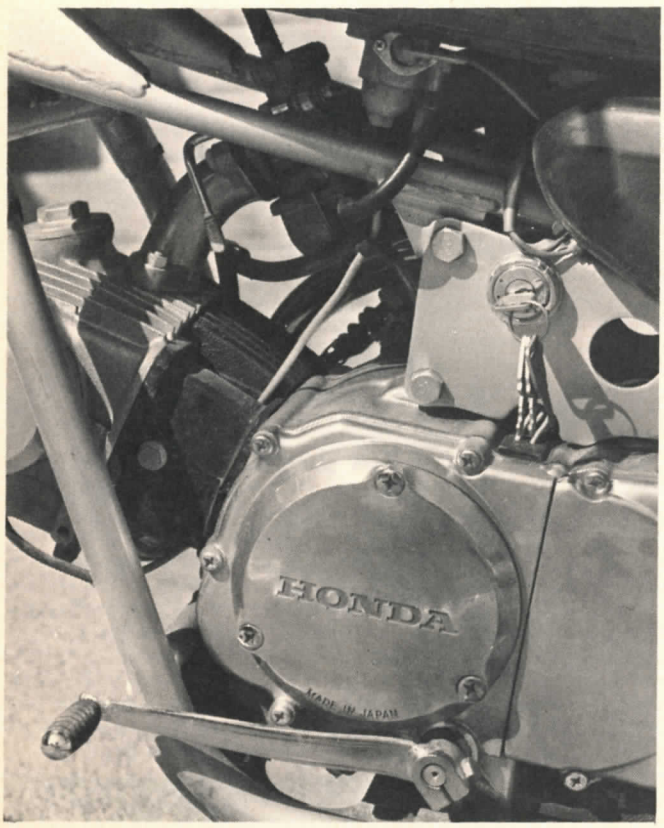
Finding something new to say about a Honda 90 is somewhat of a problem in that most everything has already been said. We'll give it a go though.

The first thing that must be said is the Moto-Crosser is underpowered

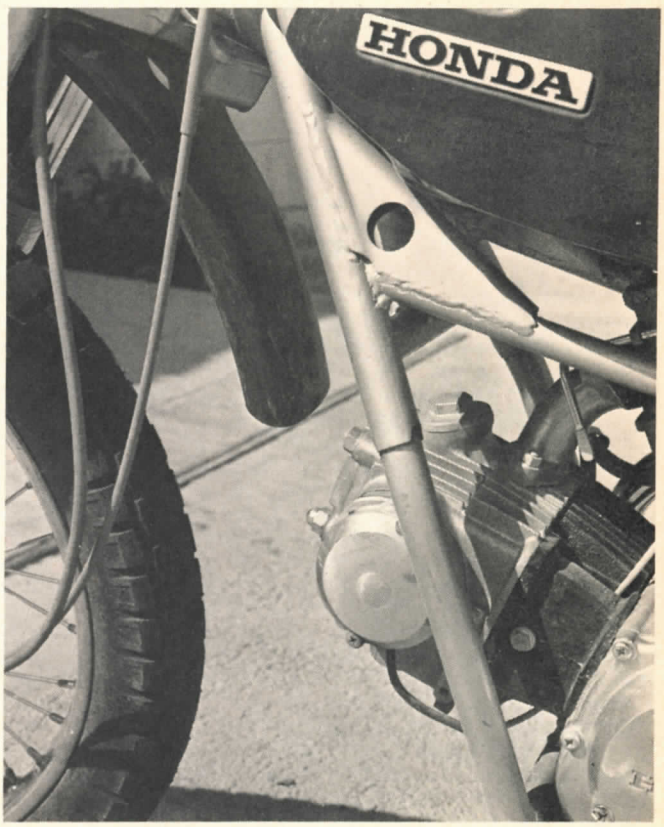
Moto-cross style forks not only look nice but surprisingly they also work well.



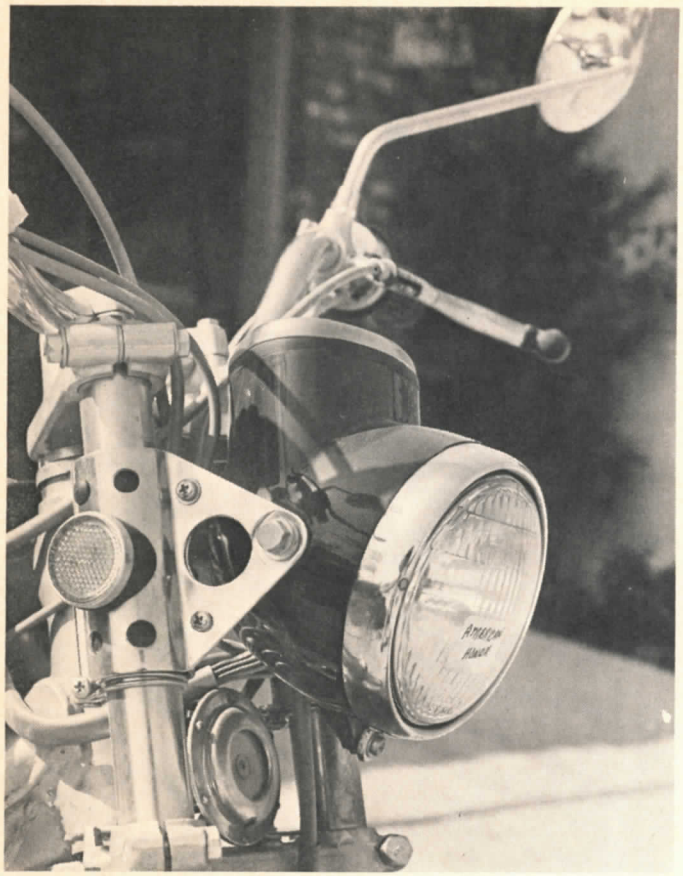
A well padded seat is a must for off-road riding and the Honda has one of the best.



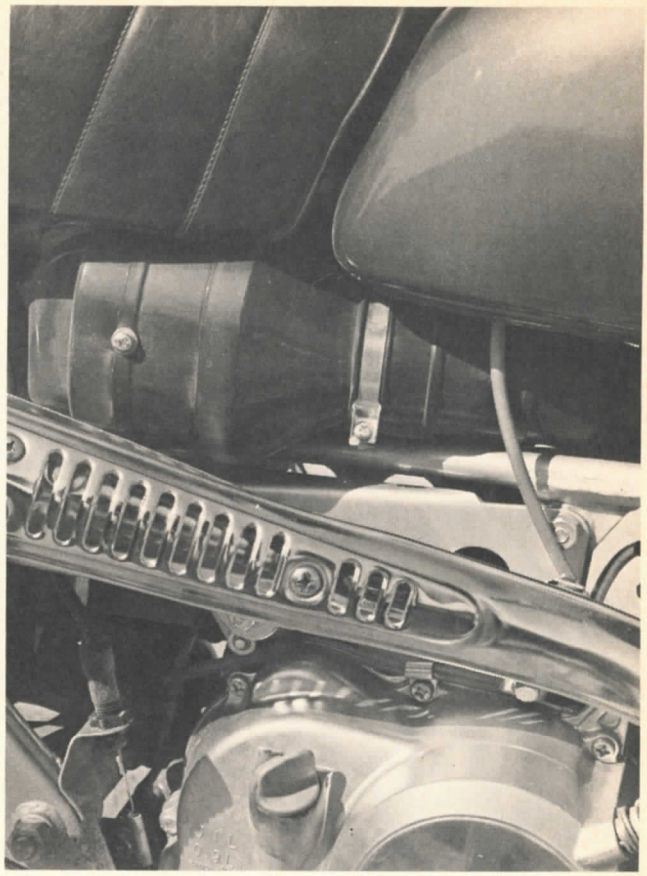
The 90cc engine is the same today as when it was introduced. In its location the ignition key is hard to get to.



The front fender is mounted high enough that with the horizontal cylinder a great deal of dirt is thrown onto the engine.



Side reflectors are provided for safety. Even the headlight mounting brackets carry out the moto-cross theme.



A large air cleaner fits well out of the way under the seat. It has a high flow rate, more than is needed.

when compaired to other 100cc machines it has to compete with. By this we don't just mean in competition on the race track, we mean on the street too. An example of this is we found the 90 straining hard to run over 52/53 mph. Please don't write in and say your 90 will run 65 or better. We know there are those that will run better than the norm. The norm happens to be just a hair less than 55 mph.

Although the bike isn't the fastest on the top end, it does show a competitive amount of torque. This is probably due to the mild cam timing that allows the bike to start pulling in the lower rpm range.

One thing that has to be said about the 90 is the reliability. We think the only way to hurt the engine is by dropping a rock on the cases – a large rock. The Honda 90 engine is the closest thing to bulletproof to be found in the industry. One reason for the reliability is that the engine has been around for a long time; it was a good engine when it was introduced, it's even better now.

The Hondas of the part haven't been known for their overwhelming handling characteristics but to our surprise this little bike isn't bad, on the contrary it's very good. The front forks have over four inches of travel, quite a bit for a small Japanese machine. The forks seem to be well dampened, a point that is overlooked by some but it's just as important as the proper springs.

The rear suspension works well too. The shocks are adjustable and even the heaviest of our staff couldn't bottom them during normal trail riding.

Styling is strictly moto-cross. From the raised front fender to the detachable tail light the appearance is that of a moto-cross bike with the addition of lighting. The seat is a big change from the usual Japanese trail bike in that it's comfortable and very well padded. It's not really long enough for two people but in a pinch it will get the job done.

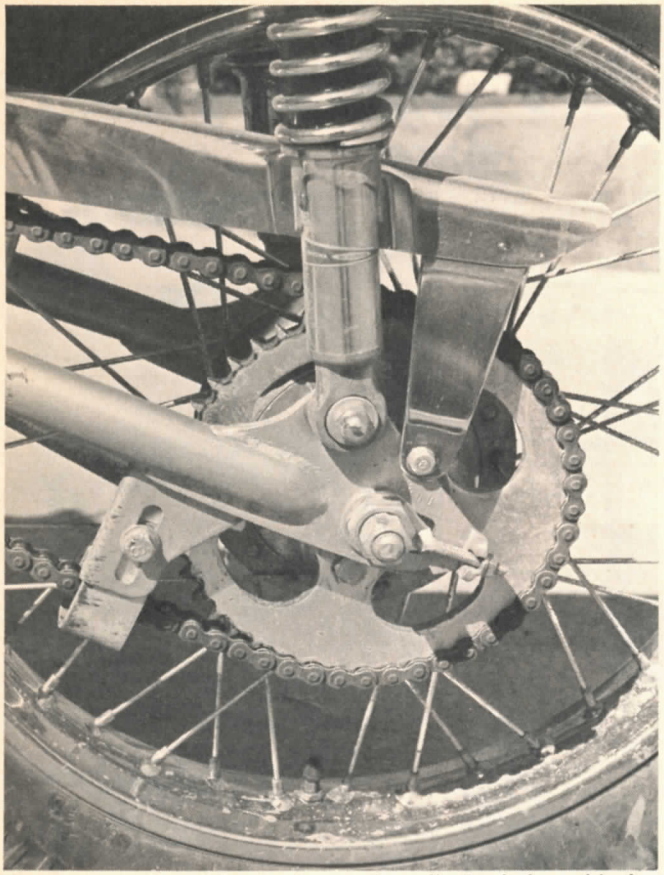
For the first time in Honda's history they've gone with a tube frame for a lightweight. We think it's about time because the old pressed steel unit had some drawbacks. The new frame is well designed, being a double down tube cradle type. It holds the engine between the frame rails and allows the cylinder and head to poke out from between them. Under the rails at the bottom is a welded bash plate, a must for off-road riding.

Because the engine is mounted horizontally, and the front fender is mounted high in the accepted moto-cross fashion, the engine has a great deal of dirt and mud thrown on it by the front wheel. This won't bother the street rider but when the bike is used for trailing it's possible for the engine cooling fins to get clogged with various matter and this could lead to seizeure problems. A cure for this would be to mount a mud flap at the back of the fender to collect the debris.

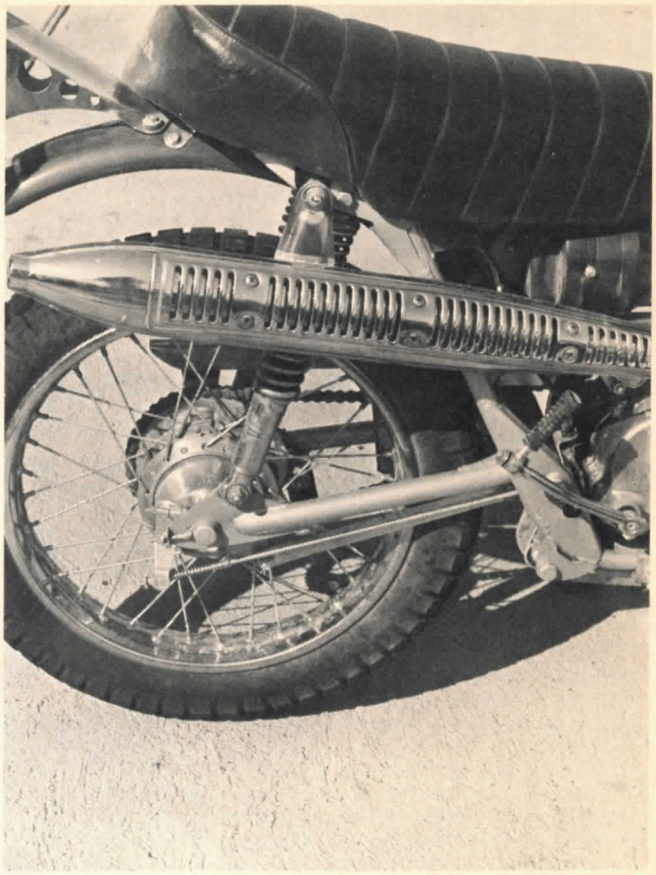
When riding the bike the positions of the controls fall right to hand. The footpegs are located in such a manner as to encourage standing while riding. The rear brake lever runs under the engine and this could lead to problems. If a rider was cresting a rut and needed the brakes, the lever could be on the ground an; this would keep it from moving when being pushed. Keep this in mind if fast cow-trailing is your thing.

One area where you can't fault this bike, or any other Honda for that matter, is in the lighting department. The front eye throws a large beam that will get you safely down the road or off the trail. The rear light can be seen from a great distance behind. Side reflectors are provided and these too add to the safety of the rider.

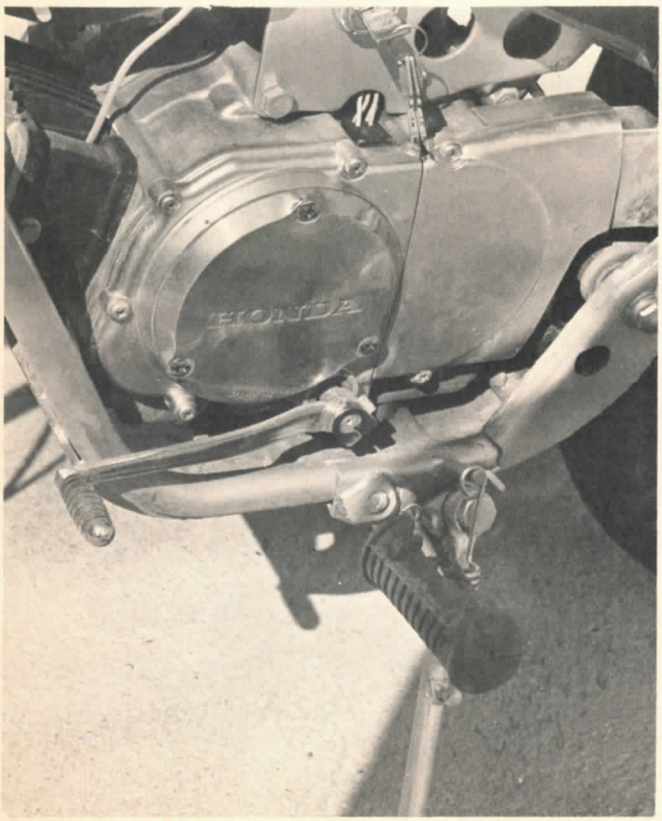
Like most Hondas this bike has a big future. It's hard to remember back to find a model in the Honda line that bombed. The new 90 has everything going for it, with a few exceptions. It's good looking, it's reliable, it has the large dealer network behind it. On the minus side, it could stand some more horsepower but that's about it. Other than this it's hard to find fault. This summer should bring thousands of these on the trails. It would seem Honda has started another dynasty.



Three way adjustable shocks work well. A chain guide is provided along with the chain guard.



Well shielded from heat, the large muffler does a good job of quieting down the high revving 90cc mill.



The footpegs are mounted low on the frame in true moto-cross fashion. This helps rider comfort when riding on the pegs.

Overall the Honda presents a picture that is pleasing to the eye. One big change this bike needs for off-road work is larger tires.

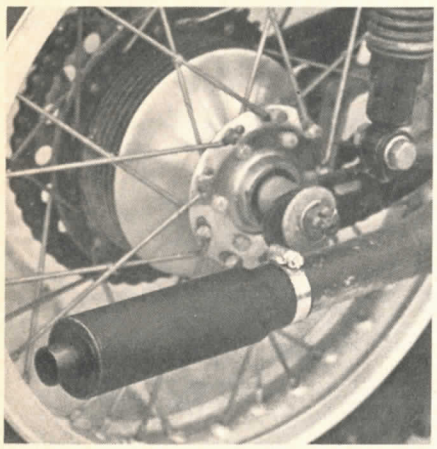
CYCLE 'CESSORIES SHOWCASE

CHRISTMAS GOODIES FOR THE RIDER

By Robert Schleicher

If you subscribe to the it-isn't-the-gift-it's-the-thought school of gift-giving and getting, you know that a cycle-oriented gift means the most to any motorcyclist. There're thousands of items that any rider would appreciate; your only problem is in determining which ones qualify for your friend's approval and the dollar-degree measure of your friendship. To help you sort through the near-endless list of "suitable" spokesmen for your Season's Greetings, we've picked a few dozen items we would like to see under our tree(s). Your choice, and ours, can be further simplified by deciding whether you want to offer (or receive) something for the machine or for the rider. Somehow, the soft clothing items like gloves, jackets, boots and such, seem to express a bit more thought on the part of the giver. Clothing, however, is one of the more difficult gifts to shop for. There's a special section on these pages devoted exclusively to the why's and wherefore's of motorcycle clothing – before you pick a present in the clothing category, you should give some attention to this whole topic of personal protection. We won't even attempt to do your Xmas shopping for you, but we can give you our choices of what we'd buy for either giving or getting. You can take our photo-illustrated suggestions as is, or use them as hints to buy other items in the same general category – at least, you'll have some idea of what you want to look at when you shop your dealer's showcase for a personal Season's Greetings cycle-gift.

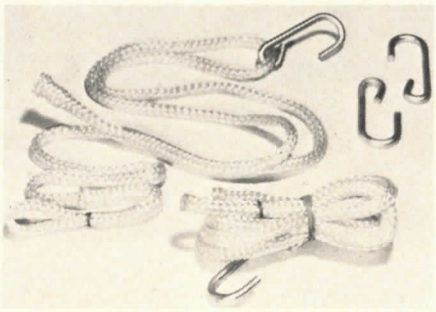
POP CYCLE PICKS: $2. to 10.



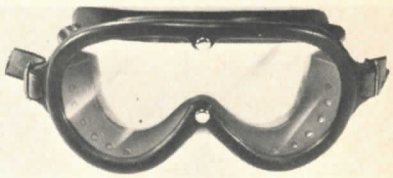
You can quiet your two-stroke's tuned expansion chamber with this special muffler from J&R. Their "X-C Silencer" does not reduce power, just noise; $8.95.

Cal Custom's spray-paint for exhaust pipes, called "Heat Proof", will withstand 1200 degree temperatures. Black, white, and a rainbow of color choices at $2.95.

One-coat of Cal Custom's "Mini Flake" spray paint provides a glass-smooth metallic finish in a choice of 9 colors. No clear or base coat needed. $2.50.

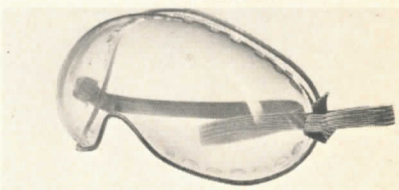


A special weave allows Steen's new nylon tie-down ropes to be self-tightening at the adjustable-loop-end – just hook the loops on and pull tight. $4.95 a pair.



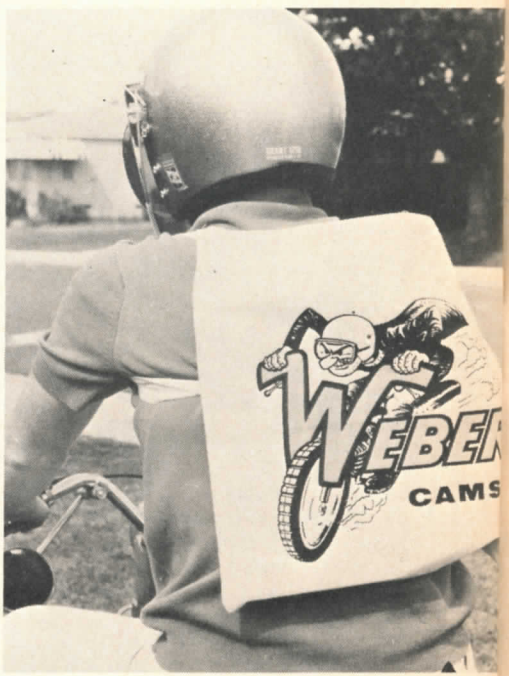
#60070

#60080

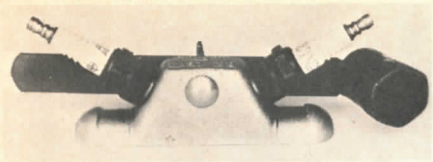


#60090

Two styles of wide-vision goggles at $3.50 each from Cragar. Center model can be worn over glasses. Economy "bubble" goggle, in clear or green, $1.60.

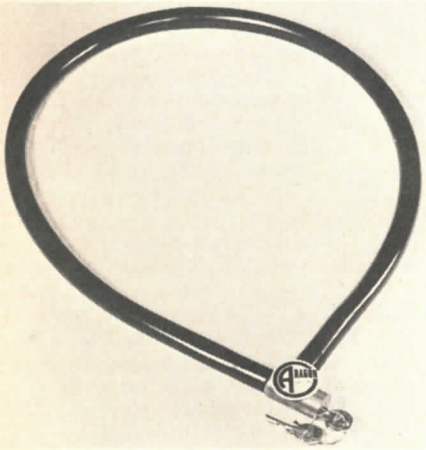


The answer to toting a short list of groceries, or whatever, while still keeping both hands on the bars: Weber Speed Equipment's "Bike Bag" is $2.50 from 310 S. Center St., Dept. PC, Santa Ana, California 92703.



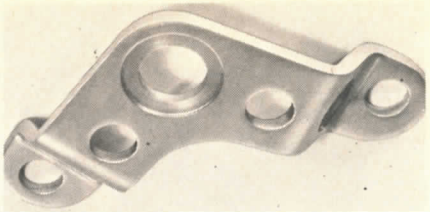
Quickly accessible spare spark plugs, with a wrench to change them, clamp on the frame in this Aragon plug-and-wrench holder. $5.95 less spark plugs.

On most motorcycles, the owner must provide constant chain lubrication – a messy job at best. Ashland Chemical's "Chain Life" sprays on a special dust repellant lubricant. $1.50 per four ounces.

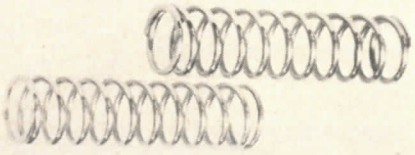


Cable-and-4-pin-tumbler-lock, from Aragon, has vinyl sheath to protect machine from scratches while locked. Available in lengths of 20", 24", or 36".

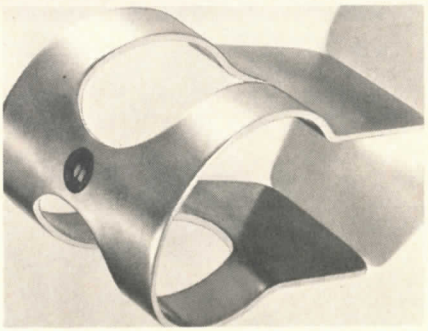
Nylon belt-type tie-downs (for bumper-rack, trailer, or pickup-bed cycle transport), have safety-belt-style adjusters; $7.95/pr. from Aragon Dist.



Add nearly two inches to the wheelbase for a smooth ride over the rough stuff, on Yamaha YJ-2, YL-1, YG-1 and Kawasaki 120cc with Circle's $6.25 rake plate.



For off the road riding; Yamaha, Hodaka, Suzuki, Kawasaki, Honda, or Bridgestone under 120cc trailbikes' forks perform better with Circle Industries $7.95 HD springs.

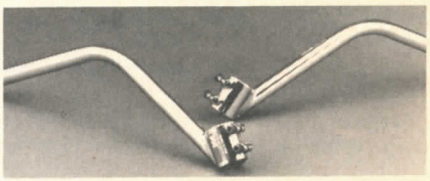


Stop front wheel "wiggle" in soft dirt or sand with Circle Industries' alloy fork braces. $6.95 for most trailbikes. $8.95 to fit 200cc and larger machines.

POP CYCLE PICKS: $11. to $20.

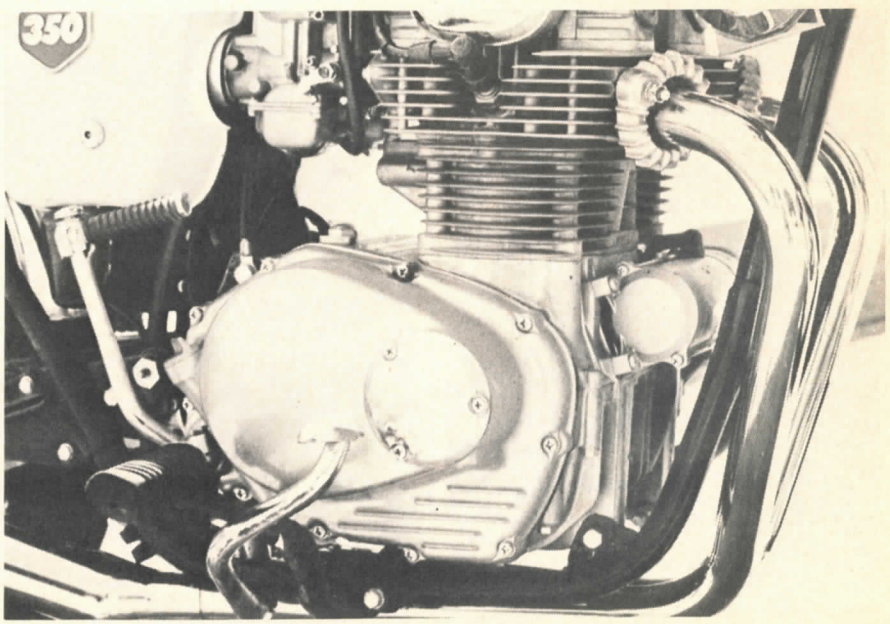
RICKMAN

Three styles of Rickman fiberglass front fenders (to fit stock or Ceriani forks) clamp onto fork legs. $11.95 each, in choice of four colors, from Steen's.



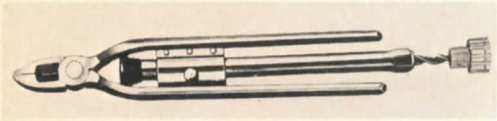
Road racing style "clip-on" handlebars, from Steen's at $15.95, clamp to forks for widest possible range of height and rake-back adjustment in-dirt or on-street.

Owners of Japanese or European made motorcycles will appreciate a quality set of socket wrenches with metric sizes, extension, handle; $11.95 by Webco.

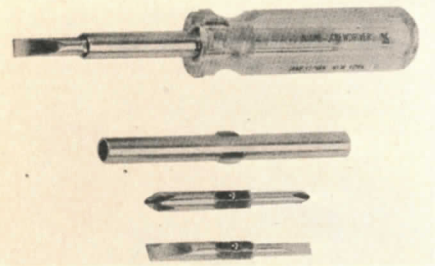


Specially shaped, tucked-in, "TT Exhaust Pipes", for Honda 250-450, are dyno-tuned by Aragon for maximum power. $19.95 in black, $24.95 in chrome plate.

Webco's "Hammer Driver" loosens, or tightens, those pesky Phillips-head or slotted-head screws without damage to screw. $10.95 with four bits.

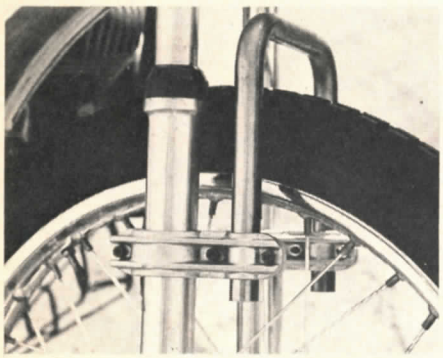


For racing or high speed touring, it's best to drill and safety wire each bolt. Aragons "Safety Wire Twisters" do the job with a quick pull on handle; $16.75.



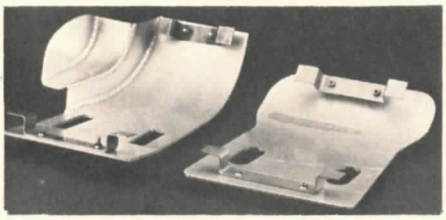
Aragon screwdriver kit offers extra-heavy-duty construction. Double-ended, reversable and removable, blades fit slotted and Phillips heads. $4.95.

Properly matched reverse cone magaphones, on the tips of a racing cycle's exhausts, can boost power by up to 25 percent. Aragon offers them for Honda, Triumph, BSA, etc.

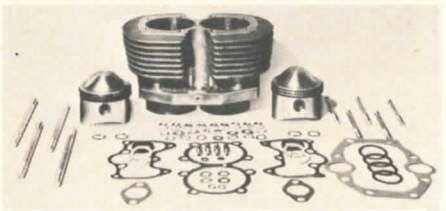


New style, clamp-on, fork brace by Aragon allows forks to twist and return to normal without bending. Fits most off-road forks; $11.95 to $21.95.

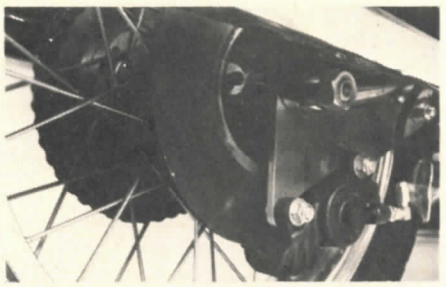
No one, anywhere or ever, should ride without a Snell approved safety helmet. McHal "Speedway", from Webco, is among the best buy; $39.95.

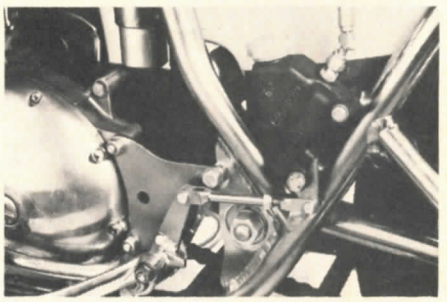


Owners of the fantastic Metisse-framed motorcycles can add off the road protection with Steen's "Case-Gard" 3/16" alloy skid plates; $48 and $30.

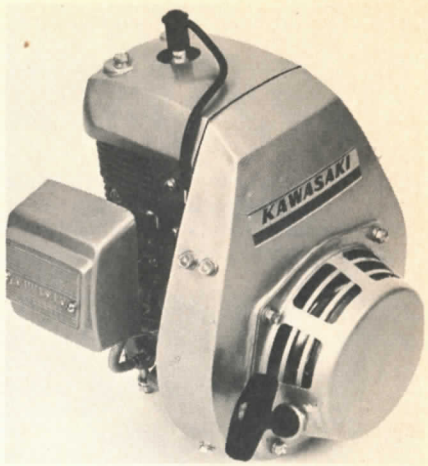


Add about 15 percent more displacement, power, and torque to your 650cc Triumph with KK's $199 "Zip-Kit". Kit simply bolts-on, without need to remove engine.





For the ultimate in street racer brake systems, or for actual road racing, try Rickman's hydraulic front and/or rear disc brake conversions from Steen's.



Add real racing power to your snowmobile or miniature dune buggy with Kawasaki's 277cc and 292cc blower-cooled engines. Electric starter and alternator included.

You can obtain catalog information on the individual items shown here by sending a legal-sized, self-addressed, envelope with 6 cents stamp. Most of these firms sell only through dealers; however, you can request the address of the nearest source of supply if necessary. Complete catalogs are available (where noted) at the prices indicated.

Aragon Dist. Co.
223 W. Camino Real, Suite PC
Monrovia, Calif. 91016 – catalog $1.

Ashland Chemical Co.
Industrial Chemicals & Solvents Div.
10505 So. Painter Ave., Dept. PC
Santa Fe Springs, Calif. 90670

Circle Industries
2536 N. Seaman Ave. Room PC
So. El Monte, Calif. 91733 – catalog $1.

Fastback
1156 N. Marshall Ave. Suite PC
El Cajon, Calif. 92020

J&R Manufacturing Co.
6001 Maywood Ave. Bldg. PC
Huntington Park, Calif. 90255

KK Motorcycle Supply
431 E. Third St., Dept. PC
Dayton, Ohio 45402

Kawasaki Motors Corp., Engine Div.
1062 McGraw Ave.
Santa Ana, Calif. 92705

Steen's, Inc.
Box 2276PC
Alhambra, Calif. 91803 – catalog $1.

Webco, Inc.
218 Main St., Dept. PC
Venice, Calif. 90293 – catalog $1.

Weber Speed Equipment
310 S. Center St., Rom PC
Santa Ana, Calif. 92703

CLOTHING

If you want to paint the picture of a fool, a good guy to envision would be the clown that tools down the street on his motorcycle dressed only in tee shirt, shorts, and sandals. People DO occasionally fall (or are ejected) from their machines and the best the ill-dressed rider can hope for is a bad case of pavement rash where his skin tries to reduce forward motion by scrapping across the street or dirt. A Snell Foundation standard Z90 approved safety helmet is an obvious must. Styles range from the bowl types used by most police forces to the deep sea diver types like Bell's "Star" – for now, we'll leave your helmet choice to you and your dealer. The balance of your body needs some protection also and that's what this bit is all about.

Dozens of firms now specialize in clothing for the motorcyclist that offer both protection and style. Most of this clothing is cut, styled, fitted, and/or padded to suit a particular type of rider; the street goer, the road racer, or the dirt/competition rider. You know where you do most of your riding, select your motorcycling outfit to suit. Headgear is the most important area of protection, so we'll assume you bought some sort of Z90 approved safety helmet when you purchased your bike. It is a bit more difficult to pick the next most essential area of protection – if you have only a protective jacket, your first spill will inevitably skin up your hips. If you have only protective pants, you'll likely scrape up a shoulder or arm – hands, torso and arms, legs, and feet all need extra protection to keep injury in an accident to a minimum.

Plain buckskin gloves will serve to protect your hands from both scrapes and blisters as well as keeping them somewhat warm. Motorcycle or sporting goods stores can supply these for about $5 to $10 a pair. Highway cruisers will want the fan-wristed "gauntlet" style gloves with or without fur linings. These range from $6 to $15. Dirt and road racers would do well to consider gloves, like the "Torsten Hallman" type, with padding across the knuckles to fend off passing brush limbs and knocks from other riders. These sell for about $13 a pair. For colder climates, a pair of thin nylon, skin-tight, stretch gloves from a ski supply shop can add warmth to any of the above.

Shirts and jackets, like pants, are now sold in modern, ventilated vinyls that resist weather, oil, gas, and lack of cleaning as well as the more conventional leather. Road riders can choose from time-honored, fur collared, police-style, jackets, or a variety of trim solid and racing striped jackets. The majority of all leather and vinyl clothing is now available in beige, blue, green, white, orange, red, and yellow if you prefer to bypass that "black leather jacket" appearance. Prices range from $19 for an unpadded vinyl jacket to $60 for fur-collared and lined leather. For street, road racing, or dirt competition, padded shoulders and elbows are a definite advantage. Padding adds only about $5 to the price. Summer riders and those in warmer climates might do well to consider the undyed "rough out" finish on their leathers. The rougher surface is claimed to reduce heat retention by as much as 20 percent, but only the natural beige leather color is offered. Jackets and shirts are normally ordered by size, with size 36 through 48 available in most styles. The serious road/highway rider and the road racer can choose from about half dozen styles of one piece leather racing suits. Prices range from $68 for unpadded black suits to $100 for padded suits in any color. These are available in sizes or tailor-made at the same prices – opt for the tailor-made and wait the few weeks requiredd for delivery.

Both vinyl and leather pants are sold in styles and colors or stripes to match or compliment the leather/vinyl jackets. Pant styles vary from full-length "Levi-style", to tapered leg, to calf length for use inside high boots. Several styles of knee and hip padding are available as well. You can obtain an "economy" pant with no belt loops, zippers, or pockets in vinyl for $19, or a specially padded "moto cross" pant in "rough out" undyed leather for $60, but the average price is about $45 to $55. Inseam and waist sizes are needed.

Footwear selection will also depend on where and how you normally ride your machine. For average street riding, an ankle-high "Chuka" type boot or Army-type brogan should be considered minimum to avoid ankle injury. Most experienced riders prefer a 12" high pull-on, zipper, or lace up boot. Conventional telephone lineman's lace-up boots or engineer's boots are available at most shoe stores for under $15. Dirt riders need the ankle support offered by a lace up boot and the soles should be filled in by a shoe repair shop so the heel front is wedge-shaped to ride over rocks and ridges whenever the foot is used to support the machine through a drift or in mud/sand situations. The very best footwear for the dirt competition rider are the European style "moto cross" boots that provide inner ankle support with laces and additional straps up the outside edges. These boots are about 17" high and range from about $40 to $50 a pair with the soles smooth and the heel faired into a wedge front edge. The 15" high, all-lace, hiking boots are the next best bet at about $27 a pair, if the heel is modified with the wedge front edge. The avid road rider or competition road racer will find the 12" to 14" high zip-up boot provides the freedom of ankle movement and enough height to keep pants tucked in. These special road racing boots have an additional strap at the ankle and boot top with prices from $20 to $40 a pair.

A final riding apparel item every dirt rider and long distance road rider should consider essential is an elastic or leather kidney support belt (also dubbed a "body support belt" by some) to keep the strain on internal organs to a minimum. These support belts can be worn either beneath or over jackets or shirts. Materials vary from elastic to vinyl to leather with zipper, hook and eye, or buckle closure. They cover about 12" of the rider's midrift. Prices range from $6 to $20.

A complete riding outfit will, then, be at least a $50 expense, with more serious riders laying out nearly $200. But, it is your body – how much do you think it's worth to protect it? Full body protection provides peace of mind that can make on or off the road riding far more enjoyable to you.

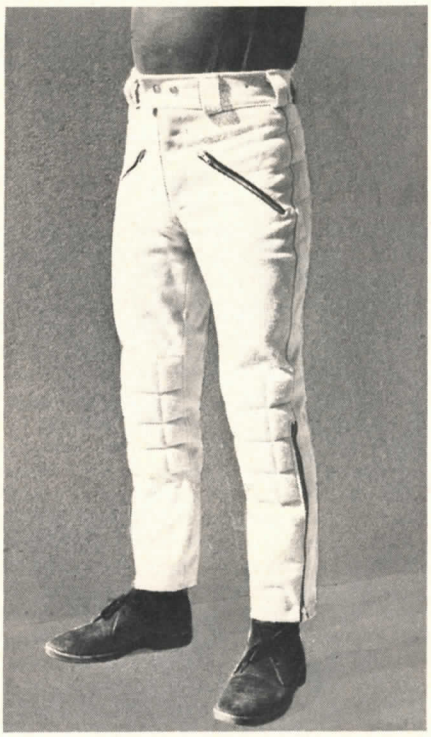
"Traditional" fur-collared black leather jacket by Webco has removable fur collar, double breasted cut to ward off wind. $59.50

"Torsten Hallman" gloves are rubber reinforced across knuckles for protection from brush, rocks, and other machines. Intended for the dirt racer, they're a good idea for any rider. $12.95 from T. Hallman or Webco.

"Pur Sang" road racing suit has one piece cut with zippered front, sleeves, cuffs. Fully lined with padded shoulders, elbows, hips, seat, knees for full wind and skuff protection. $92.50 in black, $99.50 in colors from Webco.

Endura of California and others offer padded jackets and pants in standard black or "rough out" undyed leather that is as much as 20 percent cooler (right). Padded pants range from $22.95 for unlined vinyl to $49.95 for lined leather. Padded jacket prices range from $22.95 to $49.95.

Webco's "Competition" leather pants are available with options of wool or rubber pads, lined or unlined, zipper or plain legs, nine colors. $44.75 to $59.75.



Webco offers their "rough out" padded leather dirt competition pants in three styles; full length (shown), calf length, and calf length with circular padding for moto-cross, $44.95 to $59.95.

Maximum protection and ankle support are epitomized in these "Moto-Cross" boots by Aragon or Hallman. 17" high, with inner support lacing, outer buckles, and one piece wedge-heeled sole, $47.50.

15-inch "Competition" boots by Webco have support and height needed for active dirt competition, $26.95. Heel should be "wedged" in at front by purchaser to prevent it catching on rocks, rough ground.

WHERE TO BUY BODY PROTECTION

Your local motorcycle dealer is the best source of supply of clothing. You can see and try on your contemplated purchase. The firms listed offer either mail order clothing direct to your, or a source of supply to your dealer should he not stock just what you require. Catalogs are available from most at $1.

Accessories Distributors, Inc.
602 W. 52nd St.
New York, N.Y.

Llad Leathers
3419 N. Southport
Chicago, Ill. 60657

Harley-Davidson
3700 W. Juneau Ave.
Milwaukee, Wisc.

Hank Sleegers Co.
19 Ridgedale Ave.
Whippany, N.J.

Torsten Hallman Racing, Inc.
5345 Timken St., Suite M
La Mesa, Calif. 92041

Endura of California
846 E. Valley Blvd.
San Gabriel, Calif. 91776

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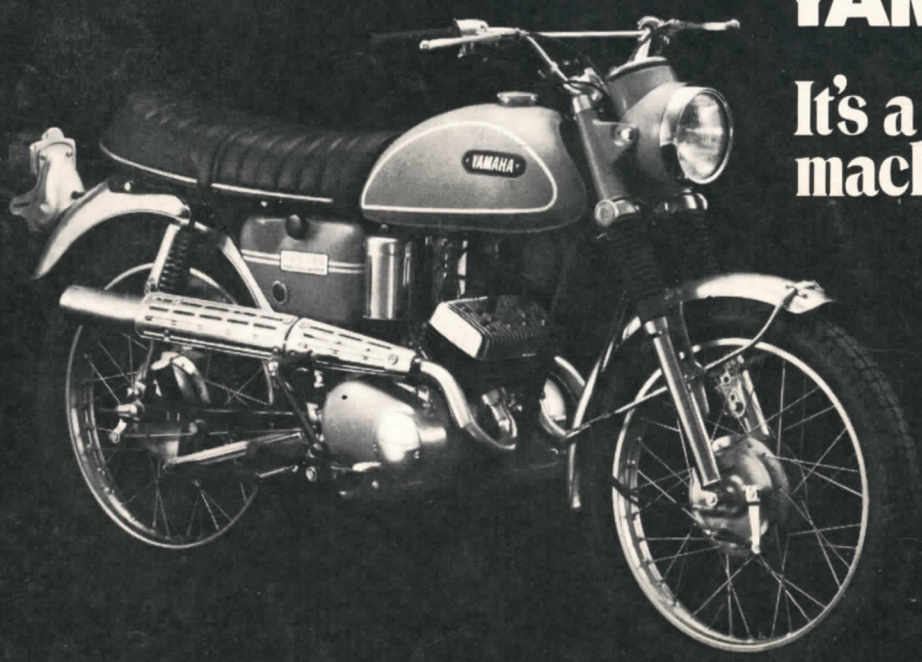
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